This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

A 5054.05.1

HARVARD COLLEGE
LIBRARY

From the Library of
HORACE FLETCHER
THE GIFT OF
WILLIAM DANA ORCUTT
January 11, 1921

Price One Shilling Net

WHAT FOODS FEED US

BY EUSTACE MILES

LONDON: GEORGE NEWNES, LTD.
SOUTHAMPTON ST., STRAND, W.

WHAT FOODS FEED US

WHAT FOODS FEED US

BY EUSTACE MILES

LONDON

GEORGE NEWNES, LIMITED
SOUTHAMPTON STREET
STRAND, W.C.
MCMV

Mod 5059.05.7

HARVARD COLLEGE LIBRARY
FROM THE LIBRARY OF
HORACE FLETCHER
THE GIFT OF
WILLIAM DANA ORCUTT
JANUARY 11, 1921

PRINTED BY WILLIAM CLOWES AND SONS, LIMITED,
LONDON AND BECCLES.

DEDICATED TO ALL WHO ARE SEEKING BETTER FOOD AS A HELP TO BETTER HEALTH

PREFACE

THOSE whose natural instinct is unperverted require no rules of diet, no hints as to what to avoid. By preference they choose what is really needed for building their body, repairing its waste, supplying its fuel, removing its refuse. They enjoy simple and cheap foods, and need have little fear that they will be either starved, or over-stimulated, or clogged. Their physical conscience tells them alike what to take and what not to take.

Most people, however, have disobeyed their physical conscience from babyhood till now. They may feel surely enough that they are ruining their bodies and minds by wrong choices and wrong amounts; they may decide vaguely to reform their ways; but when it comes to practical and positive dietaries they are at a loss; they have never been taught what builds the body and repairs its waste, and what does not do this, but rather supplies its fuel, or else removes its refuse; and what, on the other hand, is to be compared neither with bricks and mortar, nor with wood and coal, but is of little more good than a rubbish-heap or a spur!

In a word, they may know something about weight and bulk, but they know little or nothing about value and balance. Let them suspect that they are eating too little, and their sole idea is to increase the weight and bulk—to eat more; let them suspect that they are eating too much, and their sole idea is to diminish the weight and bulk—to eat less. That it is a matter of wrong balance rather than of

wrong quantity they are not aware. The result is that some reformers lay heavy burdens on their digestive and excretive organs, while other reformers under-feed their whole system in respect of body-building and cleansing elements, while they still over-feed it in respect of what clogs it, or burdens it, or over-excites it.

Good intentions may seem to cover a multitude of mistakes and their effects. But nature does not take them into full account. In a French hotel a well-meaning mother gave to her five-year-old child (which was just recovering from a brief illness due to over-eating) a "generous" meal of lobster, veal, pork, pastry, beer, and claret! Excellent as the wish was, the result was disastrous. How could that child, when herself grown up, be expected to choose the right sorts of food, and to refuse the wrong sorts?

Jewish children, as a writer said in the *Daily News*, are usually superior to English children of the same age and class, in respect of height, weight, immunity from infectious diseases, from rickets, from adenoids. Why? Because they are fed more expensively? No. Because they are fed less insanely. Mother's milk, eggs, fruit, manna-cake, oil (in the "conservative" cooking), and so on, are provided by the parents, who do not set the example of alcohol-drinking and smoking. Our children—it is too pitiful to see them slowly or quickly murdered by those parents whom the nation has taken no real pains to educate, either about food, or about air and breathing, exercise and recreation, and a dozen other important matters of daily life.

The Commission on Physical Deterioration has published a most interesting report, which lays great stress on the mistakes that people make both in choosing and in cooking their foods. Only a very few individuals, comparatively, know what foods are rich in body-building and blood-forming and other elements. The very economical foods, which are also among the healthiest for most people who try them fairly, are not honoured among us. The reason is that we do not yet realise figures and statistics. The "best-educated" English are amazed, if not incredulous, when they are told that the cheapest sources of body-building elements, according to the almost universal verdict of specialists, are the pulses (dried peas, haricot beans, lentils) and skim milk. It is time that this ignorance was removed. It is fatal to commercial prosperity, and, indeed, to all-round national fitness.

I was told quite recently that a certain company distributed in London (chiefly through the clergy) five thousand tickets, each of which entitled the bearer to a quart of skim milk free. Now, a quart of skim milk in the country would cost a farthing, in London (owing to the expense of carriage) three farthings; it would contain about 3 ounces of solids, which would contain more than an ounce of that vital, blood-forming, body-building, repairing element, proteid or albumen, chiefly for the sake of which the flesh-foods are eaten. Now, an ounce of this element, this proteid or albumen, would be found in not less than 5 ounces of beef, which would cost, say, threepence. Yet I was informed that the total

number of applicants for the free quart of skim milk was—one.

"It is not meet to take the children's food and to cast it unto dogs." It is equally unmeet to take the children's and adults' food and to cast it unto pigs, giving children and adults the impression that it is pigs' food (as indeed it is), but not fit for human beings also.

So utter and profound is the ignorance of almost our whole population; so absolute and shameless is the lack of education as to what *does* build the body, according to the universal verdict of great scientists, and what *does not* build it!

It is time that our population knew how vast a store of life-giving materials is daily ignored or thrown away as if it were worthless.

Let us approach the ignorance from another point of view.

When I pass along a certain road in West Kensington, if I were to ask the poor people there how much body-building material, how much proteid or albumen, there was in the contents of the public-house, or of the three or four sweet-shops, they would have no idea. They might or might not be surprised to hear the fact that the alcoholic drinks, and the sweets and sauces, and sickly drinks and tobacco, had in them scarcely any of the body-building and repairing stuff. But that would be the fact, according to the verdict of a hundred leading scientists.

Yet probably in that street there is not one person who would not like to be fit and strong, and who would not enjoy one of my cheap meals as much

as did the factory girls who tried it not long ago—meals that were (in theory, and in the effects on most of those who have experimented fairly) not only tasty, but also satisfying, and sustaining, and body-building, and repairing; meals that were rich in proteid or albumen, and, chiefly for that reason, theoretically scientific.

Meat the people know to be real food. They rather incline to think that fish has some good element in it. They may even suspect milk and bread of being useful as foods. But as to skim milk, oatmeal, peas, beans, lentils, at well under twopence a pound, they are pitifully ignorant. I believe they regard them as considerably less nourishing than tea!

I hope this little book will show that it is not because the masses of people have forgotten their lesson, or that their lesson was too hard and complicated. The facts are simple, and can be learnt once for all in an hour or less. The lesson has never been learnt at all; it has never been taught.

In the chart, and in most of the book, I intentionally deal with one food-element, and one only. It is not that there is no need of iron, phosphates, etc. (or "salts"), fat (or oil), sugar and starch (or carbo-hydrates), fibre (or cellulose), some bulk, and some water, as well as of taste, appetite, leisurely eating, rhythmical and full breathing of oxygen, easy frame of mind, sensible attitude of body. These things I *know* to be important. But it is my object here to teach about one thing well and thoroughly, and that one thing a vital and indispensable one, the element "which cannot be replaced by any other

element" (Bunge); the element on which by itself, "with the help of a few minerals, we might manage to prolong life indefinitely" (Michael Foster), and "without which we die" (Gamgee); the element about which —about its vital work in the body, and about its cheapest sources—most people know absolutely nothing.

This is not the fad of a crank. "Proteid first" would be the answer to the question, "What element shall we ensure first and foremost in our food-supply?" if the question were asked of authorities representing every civilised country; asked—to quote a few names from a unanimous host—of such investigators and orthodox teachers as Atwater, Bunge, Church, Davies, Forster, Gautier, Haig, Klein, Letheby, Moleschott, Pavy, E. Smith, Virchow, Wicke, Zeimssen.

Now, in view of this consensus of opinion, I am justified in devoting much of my little book to proteid or albumen alone. For I have shown sufficiently that, in the opinion of our leading experts, it is pre-eminently *the* food-element of which it is worth every one's while to know the sources.

Let me now justify my second contention: that these sources are no complex mystery impossible to master. Who runs may learn. Here is a list of proteid-values in certain raw foods, according to Dr. Robert Hutchison (author of "Food and Dietetics") and Professor Atwater (United States official Food-Investigator for the Government Department of Agriculture at Washington). I cite them in order from the lowest to the highest, with approximate percentages of proteid or albumen—

Apples (0·4), potatoes (1·2), prunes (2·4), milk and

buttermilk (about 3), cabbages (3·6), dried figs (5·5), fresh fish (10·5), walnuts (12), pork (12·3), wholemeal flour (12·9), eggs (13·1), oatmeal (14·2), salt herrings (20), beef (20), peas (21), chicken (23), haricot beans (23), lentils (23·2), cheddar cheese (33·4).

Here is no such hard thing to learn as names of capitals, capes, rivers, mountains; as names of kings and queens; as battles and dates; as the Latin for "of the liver" or the Greek for "two oxen;" as most of what we were taught at school. The foods mentioned here are very nigh unto us, and might be taught after the plan by which nearly every one of us to-day remembers the days of the months, the rhyme of—

"Thirty days hath September,
April, June, and November."

If one reads Mr. Seebohm Rowntree's book on "Poverty in York," one could scarcely dare to deny that a rhyme like mine, taught with examples and understanding in early years, with a few hints on preparation and cookery, would save a multitude of starvation and poverty through just one simple piece of essential information.

"Cheddar, lentils, haricots,
Chicken, peas, and, after those,
Beef, salt herring, oatmeal, egg,
Wholemeal flour, some parts of pig,
Walnuts, next fresh fish, then fig,
Cabbage, milk, then prunes, then roots
(Like potatoes), then fresh fruits;
In butter, arrowroot, and tea,
And sugar less and less we see
Of the body-building stuff
Of which four ounces are enough
In daily food for most of you,
If professors' words are true."

As it is, what do we find?

If the whole British population were examined as to how to choose food scientifically with a view to the best all-round results, most would answer vaguely, and would imply that it was largely a matter of how much you ate—how much bulk; and especially how much meat and other flesh-food. If, afterwards, every one were given a leaflet signed by a hundred of the leading scientists, saying that sufficient proteid or albumen (4 ounces a day, more or less) was the first essential—that this was *the* element without which we die, *the* body-building and repairing stuff—not one in a hundred would know whence to get that proteid or albumen.

This book is not intended as a complete education on all food-values. It mentions the other food-elements, particularly the natural "salts," as important, and says a word about cookery and cooking utensils, and about prices. But it is intended chiefly as a simple teaching of one and only one food-element; apparently the prime one.

For, to use the words of Professor Gamgee, "We may do without fats and live; we may do without starches and live; but *unless we have proteid we die.*"

Sir James Crichton Browne said that he considered the food-problem to be "of primary importance, more so than education." Why not have education *about* the food-problem? Let children be taught to eat and drink leisurely, and, when they have power to choose their foods for themselves, to choose sensibly; so let them, and every one else, be taught which

foods are likely to build the body, and which are not. Let them be trained to buy foods less with a view to sheer bulk than with a view to well-balanced food-elements, and, above all, sufficiency of proteid.

It is not the whole of knowledge, this knowledge of the chiefest and cheapest sources of proteid; but it seems to be the most essential thing to master. Having mastered it, we can then easily proceed to "salts," fats and carbo-hydrates, fibre or cellulose, water, taste and appetite, and freedom from excesses and from those stimulants and irritants which we can most readily avoid. Of such matters we may treat in a subsequent volume. Here we shall avoid confusion by teaching about one element *par excellence*—namely, the element that is generally agreed to be first and foremost in foods.

Even on the subject of the body-building element alone, the proteid (as I shall generally call it henceforth), this book is not a complete guide. It may be as well if I take this opportunity of admitting, as perfectly fair, certain objections which will naturally occur to readers, in addition to the above fact that those who have not spoilt their instincts need not bother at all about their choices. Desire will dictate quite safely.

(1) As to the best source for most people to choose, we refuse to dogmatise. Should our most popular proteid-supply be from milk or skim milk, or eggs, or pulses, or cereals, or nuts, and so on? Much will depend on the individual, and his or her age, occupation, constitution, etc.; much will depend

on the preparation and cookery, etc. This I freely admit. Indeed, against definite instructions as to food-values is the great fact of individuality. One and the same diet does not suit everybody. Whereas from a given recipe this person may extract 99 per cent. of the nourishment, another person may only extract 30 per cent., and get indigestion besides, the total result being a minus quantity of energy. It does not matter how "scientific" the meal may be so long as it does not suit the individual.

(2) And then there is the individual immunity. Every one seems to have his own capacity for taking things without harm, though in theory they are harmful. There is a large margin of error allowed to human beings without death or even disease, so that, in recommending a thing to a person, one may be making a mistake, and, in cutting him off from another thing, one may be depriving him unnecessarily of that which does not hurt, and perhaps—for all we know—may somehow benefit him.

(3) Besides, a certain amount of resistance to unfavourable things is good for the strength of mind and of body; it gives a person more power and independence of external conditions.

(4) Another disadvantage of a too narrow and probably a monotonous way, is that, when a person for social reasons deviates from it, he is liable to be upset—to lose his physical, mental, and moral poise and self-control.

(5) And food-science is in its infancy. It is generally agreed that proteid is the most vital of the food-elements, but it is not known how much proteid

any given person requires daily. The right amount is likely to be half or a third, or even less of the orthodox amount, provided that all the conditions are favourable. Then, again, we know hardly anything about the "salts," except that the alkaline "salts" from the plant-world (*e.g.* well-digested salads and some cereals) are of great value in most cases. We know very little about fibre, except that it does not build the body; apparently its chief aim is to satisfy the sense of hunger, and to give work to the organs of digestion and excretion; but if we can satisfy our hunger and digest our food without fibre, and if we have little or no poisonous waste to excrete, then fibre, or, at any rate, so large a quantity of fibre, may be a positive mistake.

But all these admissions together do not justify us in going on as we go on now—in a recklessly slipshod way, ignoring even the little that science does tell us. The condemnation of this "go-as-you-please" carelessness is the present state of health of the classes and masses. Advertisements of "cures" do not continue year after year unless they bring in a profit. Some firms alone spend thousands of pounds every year in advertising their drugs and pills and tonics, and so forth. These sums have to be covered, office expenses have to be covered, cost of production has to be covered, and the proprietors in addition receive a princely income. Exactly how many hundreds of thousands of pounds are spent by our people annually in so-called remedies we do not know. What we do know is that the nation is grossly unhealthy in a hundred

ways, and that this state of affairs is unnecessary; a little study and practice and education, a little co-operation, would remove nine-tenths of it.

Taking the above condemnations one by one, let us deal with them in such a way as to show that they are not an excuse for our present carelessness.

(1) First, as to the theory that we ought to eat what we want and not bother. That is well enough so long as we want what is best for us, but, once let our instincts be perverted, and we crave the wrong things. We are accustomed to feeling up to a certain standard, thanks to stimulants and irritants. We hate to fall below it. Our desire now is for that which will keep us up to that standard. It may not be the best thing for us; it may be killing us by degrees. We may have a hunger or thirst for vinegar, sauces, alcohol, tea, coffee, tobacco, and so forth. Fast eating is the best example. It would be ridiculous to pretend that a man should eat fast merely because he wants to. Probably the fact that he wants to is almost a proof that he should not. The man who has a tendency to gobble his food is likely to be the very man who needs to eat leisurely.

(2) As to the second point, individuality, the orthodox constantly object to the reformers that the reformers are laying down one *régime* for all alike. They quote the horribly hackneyed and unsound phrase, "What's one man's meat is another man's poison." They forget that they themselves, the orthodox, ignore individuality at most meals. Go through the stereotyped meals. Where is the

scope for individuality at breakfast, lunch, tea, or dinner? Besides, it is quite possible to attend to individuality, and yet to have a far more scientific choice of foods. I have over seven hundred recipes of my own. The variety of tastes seems almost infinite. It would be ridiculous to tell me that I ignore individuality merely because I exclude flesh-foods, or that another ignores individuality merely because he excludes something else. I can provide a different lunch and dinner for every day in the year, and a pleasant and scientific one too. From among these choices almost any individual will almost certainly be satisfied.

(3) We grant that human beings are allowed a margin of error—a very wide and liberal margin. An individual, like Mr. Joseph Chamberlain, can live without much carefulness and without much exercise. Another seems to have immunity from the effects of alcohol; another from the effects of condiments, and so on. But this does not prove that such things may not be fatal for others. Some friends of mine find that strawberries help their digestion and general fitness. Some other friends of mine find that strawberries bring on terrible irritation of the skin. The first class has immunity from bad effects, and has a power to get good effects. With the second class it is the reverse. Besides, we must reflect that many diseases due to mistakes go undetected until a serious illness, or perhaps death, ensues. I was consulted not long ago by a man who had visited a host of doctors, and had collected a bookshelf of prescriptions, but not one doctor had been able to tell him

what was the matter with him. He was absolutely miserable, and his skin suffered from severe irritation and tenderness, but not one doctor would admit that he was unhealthy! If terrible depression and almost intolerable irritation are not classed as diseases, then, of course, many people may be free from disease while they are making mistakes; but if we enlarge the meaning of disease and take it to include depression and morbid imagination, then we shall see that very few people do escape.

(4) We have admitted that a narrow way of diet has its disadvantages; he who deviates from it may be made very uncomfortable. But to keep to that narrow way may be better than to go into other and broader paths, and perhaps ruin body and character too, and die young. There are hundreds of cases, that have come under my notice, of people who were sliding into the grave through too wide a range of diet. When they narrowed it down, of course they had the disadvantage of a somewhat cramped life in this respect, but, at any rate, they gained in general health and enjoyment, and in self-respect that led to sensible "forethought without fear-thought."

(5) Science is in its infancy. True, but it possesses some solid facts. We are sure that some proteid is necessary for nearly if not quite every one. We are sure that some "salts" are necessary, and abundance of alkaline "salts" for most people in cities to-day. We are sure that, if the right number of ounces of proteid is not used, more ounces may be needed; for instance, if there is fast eating, there must be a larger amount of the same sort of food,

since less food is absorbed. There must be fibre so long as there is stuff to be forced through the system.

And if only science paid attention to taste, gave a fair estimate of its present state of ignorance, and acknowledged a wide range for individuality, there would be far less objection to it than there is at present.

Such as it is, I have endeavoured to set it forth clearly and fairly, gathering it from the very highest authorities, and especially from the standard works of Dr. Robert Hutchison and Professor Atwater. The two Anglo-Saxon nations owe these and other scientists a deep debt of gratitude for their impartial and whole-souled search for useful principles based on actual facts.

In conclusion, I would say that this is the first time I have treated the food-question from the present point of view. Hitherto I have preferred to say, "Such and such foods suit me best; let others try them fairly, and judge them by their results." My favourite bases or staples have been proprietary foods. As I wished this book to be taken up in schools and elsewhere, I thought it better here to exclude any mention of proprietary foods. Of course there is a certain disadvantage in this omission. It makes the ideas somewhat more theoretical. On the other hand, if any one wishes to know exactly what foods I once used to prefer, he can easily refer to "Some of my Recipes," published by Messrs. Routledge and Sons, in the Fitness Series.* And he can remind himself that it was on

* I have changed considerably since I wrote that book.

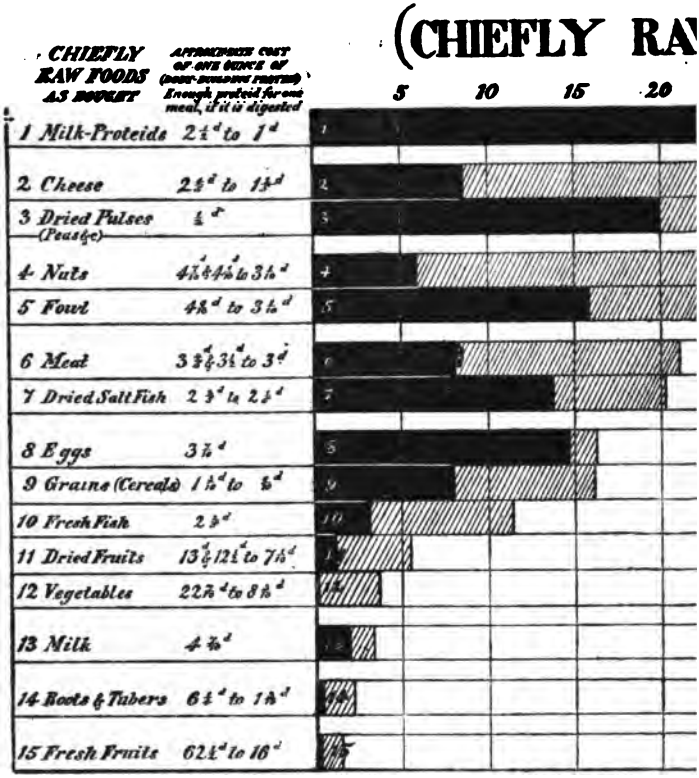
unproprietary foods that most of the nations of the past, and many of the nations of the present, thrived before city life faced them with those new difficulties with which now it is high time for us to deal by all means in our power—and especially by science and saving in our choice and preparation of food.

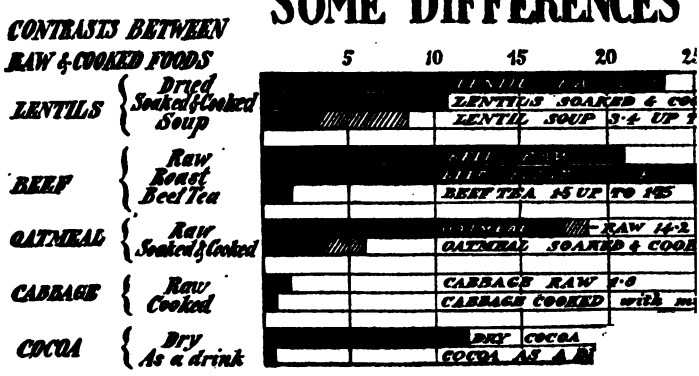
EUSTACE MILES.

CAMBRIDGE,
1905.

CONTENTS

CHAPTER		PAGE
	PREFACE	vii
	CHART OF THE BODY-BUILDING (PROTEID) VALUES OF VARIOUS FOODS ... ... *To face*	1
I.	HOW TO LEARN FACTS	1
II.	AN A-B-C-D-E-F OF FOOD PRINCIPLES	6
III.	THE INDIVIDUAL LINE OF AVOIDANCE ...	18
IV.	NOTES ON THE CHART OF RAW FOODS	22
V.	WHY PROTEID FIRST? WHAT WILL IT DO FOR US?	25
VI.	AMOUNTS OF PROTEID NEEDED DAILY	27
VII.	PRICES OF PROTEID	30
VIII.	AMOUNTS LIKELY TO BE ABSORBED, OR NOT ...	33
IX.	WHAT BESIDES PROTEID?	39
X.	NOTES ON "SALTS"	43
XI.	LENGTH OF DIGESTIVE PROCESSES	57
XII.	ORDINARY MEALS ESTIMATED	61
XIII.	SIMPLE MEALS AND THEIR BODY-BUILDING (PROTEID) VALUES	66
XIV.	AN A-B-C-D-E-F OF COOKERY	68
XV.	USEFUL APPARATUS	78
XVI.	FOODS THAT PEOPLE DESPISE AND WASTE ...	79
XVII.	THE COST OF CLOGGING	84
XVIII.	VALUES OF LEISURELY EATING	91


(CHIEFLY RA
CHIEFLY RAW FOODS AS BOUGHT
APPROXIMATE COST OF ONE OUNCE OF (DRY-SUBSTANCE FREE) Enough proteid for one meal, if it is digested
5
10
15
20
1 Milk-Proteids 2½d to 1d
2 Cheese 2½d to 1½d
3 Dried Pulses (Peas &c) ¼d
4 Nuts 4½d & 4½d to 3½d
5 Fowl 4½d to 3½d
6 Meat 3¾d & 3½d to 3d
7 Dried Salt Fish 2¾d to 2½d
8 Eggs 3½d
9 Grains (Cereals) 1½d to ½d
10 Fresh Fish 2½d
11 Dried Fruits 13¾d & 12½d to 7½d
12 Vegetables 22½d to 8½d
13 Milk 4½d
14 Roots & Tubers 6½d to 1½d
15 Fresh Fruits 62½d to 16d


SOME DIFFERENCES
CONTRASTS BETWEEN RAW & COOKED FOODS
5
10
15
20
LENTILS
Dried
Soaked & Cooked
Soup
LENTILS SOAKED & COO
LENTIL SOUP 3·4 UP T
BEEF
Raw
Roast
Beef Tea
BEEF TEA 45 UP TO 145
OATMEAL
Raw
Soaked & Cooked
RAW 14·2
OATMEAL SOAKED & COOK
CABBAGE
Raw
Cooked
CABBAGE RAW 1·0
CABBAGE COOKED with m
COCOA
Dry
As a drink
DRY COCOA
COCOA AS A

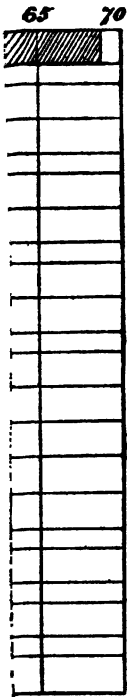


CHART OF THE BODY-BUILDING (PROTEID) VALUES OF VARIOUS FOODS

(Chiefly from the Analyses by Dr. Robert Hutchison, in his "Food and Dietetics")

"*Proteid matter we must have always.*"
Prof. Sir MICHAEL FOSTER, F.R.S.

"*Unless we have Proteid, we die.*"
Prof. GAMGEE, F.R.C.P., F.R.S.

NOTE.—The idea of a Chart of Proteid-values of all foods was suggested by Lieut. Flynn. In this Chart and book no proprietary foods are mentioned. Most of the analyses and prices were collected by Mr. W. S. Sheppard. The Chart itself was arranged by Mr. Eustace Miles and Miss Ethel M. Miles.

WHAT FOODS FEED US

CHAPTER I

How to learn Facts

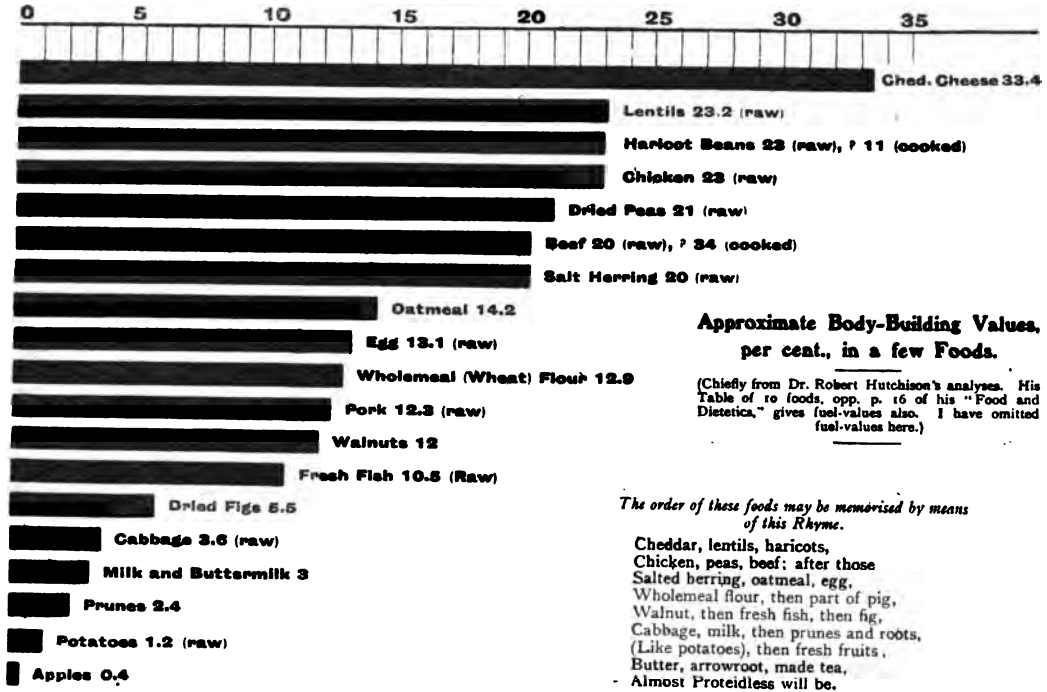
THE usual way of teaching facts is to begin with principles and proceed to detailed Tables, corresponding to the ordinary maps of England, utterly confusing through their excessive fulness. The principles, perhaps, will be followed by some examples; perhaps not. Most books on food-values do not give practical examples; they are not written for average human beings; it is doubtful for whom they are written, except the specialist and the man who is going to be asked abstract questions in an examination.

Now, part of the art of mastering a subject is to omit, at any rate at the beginning.

Another part of the art is to know that the subject is important for daily life. Why is the study of food-values important? Because it should lead to all-round fitness and get rid of or prevent disease; it should lead to every kind of economy—of money, time, and energy; it should lead to humaneness, wherever that is feasible; it should lead to more sympathy with those whom we are inclined to condemn as wicked, whereas among the chief causes of their wickedness are their overwhelming errors in diet.

We must also start with interesting instances, generally as familiar as possible, extract from these

DIAGRAM I.



Approximate Body-Building Values, per cent., in a few Foods.

(Chiefly from Dr. Robert Hutchison's analyses. His Table of 10 foods, opp. p. 16 of his "Food and Dietetics," gives fuel-values also. I have omitted fuel-values here.)

The order of these foods may be memorised by means of this Rhyme.

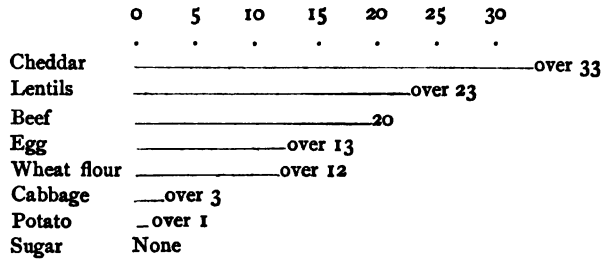
Cheddar, lentils, haricots,
Chicken, peas, beef: after those
Salted herring, oatmeal, egg,
Wholemeal flour, then part of pig,
Walnut, then fresh fish, then fig,
Cabbage, milk, then prunes and roots,
(Like potatoes), then fresh fruits,
Butter, arrowroot, made tea,
Almost Proteidless will be.

the principles, and then proceed to build up our fuller knowledge, not by adding entirely new ideas, but by adding ideas which involve the old and introduce a little new as well.

The first examples and their principles we must realise and digest fully before we proceed to the new.

In order to realise we must see; for instance, we must see diagrams like this one (from "A Boy's Control and Self-expression"). Perhaps even this is too involved and elaborate to start with. If it is so, then a part of it may be mastered, as in the second diagram.

DIAGRAM 2.



Very rough idea of body-building values of cheddar cheese, dry lentils, raw beef, egg, wheat flour, cabbage, potato, sugar, according to chemical analysis.

There must not be too many details. These Tables, for instance, give no notion as to the other food-values; they do not give the proteid-values of all the kinds of cheese, for example. These details, important as they are, will not be in place till general proteid-values have been mastered.

Then, again, we must use comparisons and contrasts. We may compare the proteid to the

bricks and wood of the body; we may compare the carbo-hydrates to the wood and coal of the body; and so forth. The comparisons are not meant to be descriptions, they are meant to make us realise one or two of the important aspects at a time.

Repetition is essential. It is no use nowadays to state a thing once, even very vividly; things must be stated *ad nauseam*. The few careful readers may be disgusted; the many careless readers will be instructed. I find that it takes many repetitions in an average book before the reader grasps the fact. In former times, when a book was digested, it was different. To-day, people glance over their daily paper, and assimilate scarcely anything. They transfer that habit to their books. They gobble and bolt pages with their eyes.

Some principles and facts must be fixed indelibly in the memory. Most of us know the number of days in a given month, thanks to the rhyme, "Thirty days hath September." This principle we can apply here, as in the rhyme above. All kinds of *memoria technica* will be found valuable, *e.g.* those in the chapter called "An A-B-C-D-E-F of Cookery." Many other sorts of *memoria technica* will be equally useful. If we can remember without them, of course we need not use them.

Above all, we must apply what we learn. Merely to learn, even in all the above ways, will not be sufficient; we must put the teaching to the test of experience if we wish to assimilate it. Not only must we read, mark, learn, and inwardly digest, we must also outwardly express.

In the next chapter, for example, will be found a brief account of what seem to be the chief food-elements. We must put the principles to the test of practice in as many of our daily meals as possible. Otherwise "science" is barren. Unmated to sensible action, she cannot bring forth her precious children —fitness, success, and happiness.

CHAPTER II

An A-B-C-D-E-F of Food Principles

AVOIDANCE
BRICKS OR BODY-BUILDING PROTEIDS
COALS OR FUEL (CARBO-HYDRATES AND FATS)
DIGESTERS (including some "SALTS")
EXCRETERS (including FIBRE AND WATER)
FLAVOURS (but not to encourage excess)
GOOD AIR AND BREATHING
HEALTHY AND HAPPY THOUGHTS
INDIVIDUALITY

Avoidance

ALTHOUGH each person has an individual line of immunity (see the special chapter), yet certain things are to nearly every one undesirable. Among these the best-known are stimulants, irritants, and narcotics. Alcohol may be an example of all three, according to the person, his condition, the kind of alcohol, etc. Though it may be unwise to give them all up in a moment, yet their habitual use should be brought down, gradually in many cases, to the minimum or towards it.

We should avoid dull things as well, for, as a rule, they are not used by the system; they become a positive burden. Some have a special power of digesting them; but most of us had better take a little good stuff that we like than lots of goody-goody stuff that we dislike.

Excess should be avoided. As we shall see later

on, it is not so much excess of all elements equally, as most doctors and teachers seem to imagine, but excess of some elements, perhaps with deficiency of others. It is an upset balance.

Deficiency must be avoided, and especially deficiency of natural "salts" (the alkaline, in particular, as in well-prepared vegetables) and body-building proteids.

Bricks or Body-Building Proteids

The importance of this element in foods will be shown directly. At present there is much ignorance on the part of the public. The body is often compared with a machine, but it is not like an ordinary machine. An ordinary machine, say an electric apparatus, dependent upon a stove or furnace for its motive power, does not live upon itself, its machinery, when the coals in that stove are exhausted. The human body does live upon itself, not only when its coals are exhausted, but perpetually. The human body is continually being broken down and turned into waste. It lives upon itself; in fact, apparently it is only or mainly upon itself that it does live. Food has to become part of the human body, it has to become blood (and it takes a long while for it to become blood) before it can be of use in supplying nervous and muscular energy.

If we examine the ordinary diet of the poor, and if we examine the ordinary gifts of rich people to the poor, the so-called charity gifts and hampers, we shall find a ghastly deficiency of proteid. Mr.

Seebohm Rowntree, in his study of the poor of York, came to the conclusion that in many cases the amount of proteid taken by many of the people was actually 25 per cent. too small.

Perhaps it would be better to call proteid not only the bricks of the body, but also the wood, wood being used not merely in the structure of the house, but also as fuel in the fire. Proteid has many functions. It is almost a complete food. I have thought it better to emphasise one use of proteid, its use to build the body and repair its waste, rather than a second use, the use to supply fuel.

Coals or Fuel

It is generally held that fats, starches, and sugars cannot by any possibility build the body. Although they are found in the cells of the body, yet they cannot do what proteid does. Proteid is, to some extent, like the iron and bricks of the fireplace, and like the wood and coals as well; the wood and coals will burn in the human fireplace and give power and heat, or else they will be stored up in the body, ready for burning.

The fats, starches, and sugars, on the other hand, are of value not in building the body (proteid alone can do that), but in saving proteid and sparing it. Suppose a man had no coal or fuel-element in his food, then he would have to take very much more proteid. Up to a certain point, the more coals he takes in the form of fat, etc., the less proteid he requires. Proteid is a very expensive form of fuel. It is as if we were to burn our fireplaces for fuel.

Some coals or fuel burn quicker than others. You cannot tell which burn most quickly by throwing them into a fire. The oil in the human body is the slowest fuel, and "stands by one" best; then comes the starch—that is a slow fuel too; then comes the sugar; and then—in so far as it is a fuel—alcohol.

But fuel is useless unless it be absorbed by the body, and then set on fire and turned into energy. Merely to carry about in one a whaleful of blubber would not be a proof of strength; it might be a very heavy burden for the system. We must have the suitable fuel—and different fuels suit different people—so that it may be digested and absorbed and ready for use.

Digesters, therefore, may be required.

Digesters (including some "Salts")

Some foods are self-digesting. We may compare them with a match. The match only needs to be rubbed, and it will burn itself out of its own accord. That is what some foods do: of their own accord they give their fuel-value. Probably there is no food which is self-digesting, as it were, for all people. Two of the patent kinds of milk-proteid are the nearest approach I can suggest; but in this book all mention of patent foods is excluded.

Appetite is the best digester. Of course you can wait till you are no longer hungry, and only exhausted, but the best digester is hunger in moderation. It must not be confused with fermentation, which gives a sense of emptiness and weakness, even when the

stomach is distended with food and gas. Genuine hunger will be satisfied with the very simplest things, even a crust of brown bread, though there is seldom any necessity to confine ourselves to such things.

Digestion can also be helped by taste. Apparently taste affects the emotions, and hence the digestion through the sympathetic nervous system, as it is called. Digestion is not dependent on the swallowing of food; it is a process that may begin when the food reaches the mouth, or even when we imagine the food reaching the mouth, or, in some cases, it may not even have begun when the food is actually leaving the body, as would be the case if we swallowed and excreted a nut whole.

Some tastes, however, are on the whole bad for the digestion. There are many who love the taste of cucumber with vinegar or pepper, or of lobster, and so forth, though such things regularly disagree with them. Besides, too much pleasant taste may encourage eating in excess. But a certain amount of taste is desirable if we have not genuine hunger, and if, in spite of this, we have determined to eat.

As to the "salts" that help digestion, very little is known about them. Malted foods may be more easily digested in many cases than plain foods, and there may be other helps as well. We know that natural "salts" are essential to digestion. I have found by experience that most foods, when cooked with their natural juices, are far more digestible than the shredded or sawdust-like remnants usually served at British tables.

As to fibre, it is not assimilated by the body,

but it may have a decided use in most cases in encouraging the worm-like movements of the digestive and excretive organs.

Excreters (including Fibre or Cellulose)

Fibre or cellulose—found in bran, etc.—is one of the best excreters. Some of it may help the excretion by irritating the surfaces of the organs. This is probably the case with the coarse kinds of wholemeal bread; it may be the case, to a great extent, with the tiny pips of figs and some other fruits. Mr. Horace Fletcher holds that, if we thoroughly masticate our food, we do not need to swallow fibre; the use of the fibre, he thinks, is simply and solely to force the waste-matter through the system before it becomes objectionable. If we have mixed our food thoroughly with saliva, and have also broken it up thoroughly by careful eating, then there is scarcely anything objectionable to be removed.

It is not merely because of their fibre that fruits like prunes may be good excreters; they may contain certain "salts." A well-known aperient is entirely devoid of fibre; it seems to supply a natural juice which the intestines lack. Perhaps, also, the water in which bran and raisins have been boiled may contain a "salt" which will serve as an aperient.

Water is the best of all excreters for ordinary purposes. It may be taken in many ways, but it should not be gulped down during meals. We should rather take it the first thing in the morning and the

last thing at night. The softer the water, and the purer, the more impurities it will take up and carry out of the system.

Good exercise is another excreter; partly because through it we get rid of too much heat; partly because it helps to pass impurities through the skin and mouth, etc.; partly because it strengthens the muscles of the trunk.

It will be better if it is followed by a thorough washing and rubbing; for the skin is our best organ of excretion, and in city life it is vitally important to keep it in good training. Washings and rubbings will help to do this.

But the best relief to excretion is to take into ourselves as little as possible that needs to be excreted, and therefore to choose what we can use most thoroughly and absorb most completely.

Flavours (but not to encourage excess)

I have already spoken of the value of flavours. Even the more fiery condiments, such as the much-advertised sauces, and pepper, and mustard, may have their value occasionally, in so far as they help the digestion. In theory, it would be better not to eat unless we felt hungry; but in daily life we insist on it, or some member of the family insists for us. Then it becomes a question whether we shall add a flavouring that will arouse the digestive juices, or whether we shall plod through the dull, flavourless dish, and probably keep it within us, a burden unassimilated and perhaps fermenting.

There are, however, some clean yet pleasant flavourings which are unlikely to do any one any harm. Among these are the flavourings which naturally belong to plant-foods, such as lettuce, when they are cooked with their own juices in a little butter. And our little gardens should be rich in herbs like parsley, thyme, savory, marjoram, etc.

The two harmless flavourings combined—the innate flavouring of beans, let us say (when none of their water has been poured away, but all has been absorbed), together with parsley or another herb-flavouring—may make palatable, and therefore digestible, many dishes which now are execrably dull, and therefore indigestible, or only slowly digested.

But there is another remedy besides the addition of flavourings—that is, leisurely eating. If you eat more leisurely, you are likely to get more flavouring out of everything that you eat; and, besides, you will acquire a new instinct, so that what at present seems dull really has a distinctive and pleasant taste of its own.

This will be the case especially if you attend to the various conditions of successful eating. Among them is good air, rightly breathed.

Good Air and Breathing

Without oxygen we are unlikely to digest our food. It may be compared with the match that lights the fire, and turns fuel into power. It also serves the purpose of purifying the system. Of course, when the air is foul, the less we breathe of it the better.

But, when the air is fresh, then we should breathe leisurely, yet deeply and fully, during our meal. This will help to massage the important organs of digestion; it will make us attend to better positions of the body, till these become habitual and easy; and will make our emotions more satisfactory. The emotions influence the digestion enormously. By special ways of breathing we can easily become calm and comfortable, so that our food does us twice as much good as it would otherwise do.

Healthy and Happy Thoughts

Professor Pawlow, of St. Petersburg, and Dr. Cannon, have emphasised the importance of healthy thoughts and cheerful thoughts, especially for the process of digestion. Mr. Horace Fletcher has emphasised the importance of leisureliness and thoroughness. There has to be freedom from worry and hurry. But how are we to secure better feelings, saner feelings?

First of all, there are the bodily attitudes and expressions. There is an attitude of depression which is decidedly bad for the digestion; there is an attitude of enjoyment; there is an expression of worry and hurry; there is an expression of cheerfulness and quietness. Among the means of expression that we can easily regulate are the breathing, the eye, the muscles of the hand, the muscles of the face, and so forth.

Of course we can also use our mind. If pleasant things are not at hand, then we can remember and

imagine pleasant things and suggest pleasant things to ourselves. This is a power that we have always with us, this and the power of better physical expression. The good (external) conditions themselves we have not always with us.

Individuality

What to avoid is largely an individual matter. So is what to use. For instance, lentils are a food to be avoided by certain people. I have one friend with whom they have never yet agreed. On the other hand, this friend can take certain things with impunity that would upset me altogether. Some people must eschew beef, mutton, lobster, milk, skins of plants, seeds of plants, and so forth.

More than is usually suspected depends on the way of cooking, on the number of flavours added, on the pace of eating. With good cookery, good flavourings, and leisurely eating, comparatively few things disagree. Under ordinary conditions oatmeal porridge disagrees with me; under such conditions it may agree with me fairly well. The result is that, when I am offered porridge in some one else's house, and when I know that it has been badly cooked, and when I know that I shall be tempted to eat it fast, I refuse it; but at home, when I can get it properly cooked, and when I can eat it very leisurely without annoying any one, I occasionally find it useful.

Many mistakes are made by those who preach about diet.

The first is to lay down laws supposed to be based on "Science," and to ignore individuality; for instance,

to tell people that lentils are far more nourishing than beef because they contain 23 per cent. of proteid, whereas beef has only 20, and has little if any fattening and heating materials. The test is not what the Tables of analysis say, but what the human inside says.

Equally fatal is the mistake which is based not on Science, but on individual experience. A man finds that wholemeal bread and apples suit him. At once he thunders forth a law, that apples and wholemeal bread are the only healthy food for all mankind, whether wholemeal bread be clean and well-made or not, and whether apples be in season or not.

Between these two mistakes we have to steer. We must not ignore Science altogether, for it will save us from many errors; we must not ignore individual experiences, for they may put us on what may be the right track for us as well.

The best way is—

To study Science up-to-date—it will change a great deal in the next few years; to study it and use it as a general guide and as a saver from serious errors;

To study personal experiences of others in the same way;

Then to apply what seems sanest and most feasible, and to judge it by its results in our own case, and to be ready to change if a better way appears or if the results continue unsatisfactory.

But there must not be fussiness. We must steer, once more, between fussiness and carelessness. To be anxiously cranky is a mistake. To be thoughtlessly slipshod is a mistake too. The man who goes

on taking things that injure his health simply because he does not wish to be "fussy" is perhaps more to be blamed than the man who refuses everything that might possibly injure his health, who weighs out his food scrupulously and conscientiously, and who is upset by a grain too much of this or a drop too little of that.

CHAPTER III

The Individual Line of Avoidance

PROBABLY for every one there is a large set of so-called foods that he would be better without. *The British Journal of Inebriety* is devoted not to preaching total abstinence, but to collecting statistics as to causes, effects, and remedies. Its articles are not fanatical, but scientific; they point out what are the proved results of excessive alcohol-drinking, and even of moderate alcohol-drinking, in most cases; for instance, it seems clear that in most cases alcohol disturbs the action of the heart, shrivels the red corpuscles of the blood, and so hinders the free carriage of oxygen, hinders also the free excretion of waste, and so forth. In theory it would be best for nearly every one never to take alcohol at all.

On the other hand, there comes the question of what is worth while to-day. Not only does it apply to alcohol, it applies to tea, white flour, condiments, and all badly cooked articles. It is worth while, people say, to make some mistakes, if only for the sake of seeing people; to take some stimulants for the sake of doing certain work within a certain time and of avoiding immediate monetary loss and worry.

This must be for the individual to decide after weighing the *pros* and *cons* fairly in his sanest moments. He may decide to take the things because the *pros* in his mind weigh heavier than the *cons;* he may be able to get rid of some bad effect by suggestion or imagination, or by exercise or other remedial

treatments. Meanwhile, perhaps, he may take the bad elements as it were under protest, not as the slave of them, but as finding them convenient temporarily. He may minimise the quantities; he may avoid the faults wherever he can easily do so.

We might class the things to be avoided in many different ways—for instance, as stimulants, irritants, and narcotics; to which list we must add excess and deficiency. Among the stimulants will be alcohol, which may also serve as an irritant or as a narcotic. Pepper is an irritant, tobacco a narcotic. Much of the effect depends upon the previous state of the blood and mind, on the quantity taken, and on other conditions.

It is important at the outset not to fall into the error of one-sided preachers who make absolute statements for all people alike. *We must distinguish between what may be a remedy when the balance is upset and what would upset the balance if it were already normal.* As a clear instance, take the case of fasting. It is one thing not to eat food, perhaps to sip water, when we are ill; it is another thing to continue this treatment when we are well, since in that case an excellent remedy for a number of people when they are ill becomes the opposite of a remedy, a cause of illness, to the same people when they are well.

Then, again, we must take into account whether the person has plenty of remedial means within his power. If he has abundant air, exercise, holidays, recreations, money, and so forth, then he may decide to make more mistakes. We should not advise him

to, but he may decide to make them; it is his own look-out.

But in each case the person should make his individual line of avoidance. Some things he must avoid altogether. Some he must avoid as a rule; for instance, he must avoid them except when he can get abundance of exercise. Other things he must avoid in large quantities. Other things, it seems, he need not avoid; he is not at all sure that they do him any harm.

What Science is beginning to recognise is the individual power to resist certain conditions. It is laid down as a law that certain things are bad for everybody because they are bad for most bodies; but there may be people with the digestion, let us say, of an ostrich. For them, mistakes may be almost required in order to give the abnormal powers due work. In other cases the mind may come into play and prevent or destroy the bad effects which would otherwise ensue.

Here is my own line of avoidance, not as a guide or rule for others, but as a sample. Each should make his own private line, collecting a list of things with far too wide a range apparently, rather than selecting only just a few very unfavourable items.

Things to be avoided almost altogether—All flesh-foods (including fish and fowl) and their extracts, oatmeal, coffee, tobacco, nearly all drugs.

Things to be avoided as a general rule—Much egg, sugar, most alcohol, potatoes, pastry, much salt and pepper and mustard, much white flour, much milk

and milky pudding, cocoa and chocolate, much fiery sauce and flavouring, such as curry.

Less injurious, especially when well chosen and well prepared—China tea.

Then could follow a list of the things that *suit me*, such as cheese, the pulse-foods (when my physical life is active), wholemeal bread, cucumber, etc.

CHAPTER IV

Notes on the Chart of Raw Foods

1. *Milk-Proteids* (*Skim Milk Dried*)

THESE are all proprietary foods, at present; one part = about four parts of meat, in proteid (Hutchison).

2. *Cheeses*

Cream cheese	8·6	Dutch	30·8
Camembert	21·0	Gruyère	31·5
Stilton	23·9	Cheddar	33·4
Gorgonzola	25·9	Gloucester	36·7
Cheshire	29·4	Parmesan	43·8

3. *Pulses* (*Dried*)

Butter beans	20·0	Peanuts	24·0
Peas	21·0	Windsor beans	26·4
Haricot beans	23·0	Soy beans	32·9
Lentils	23·2		

4. *Nuts*

Cocoanuts	5·2	Pistachio kernels	21·7
Chestnuts	6·6	Sweet almonds	24·0
Filberts and hazels	8·0	Brazil nuts	26·0
Walnuts	12·0	Butternuts	32·0

5. *Fowl*

Goose	15·9	Wild duck	22·0
Turkey	20·0	Chicken	23·0
Pigeon	21·0		

6. *Meat*

Bacon	8·1	Veal	17·0
Pork (very fat)	9·7	Lamb (medium fat)	18·5
„ (medium fat)	12·3	Beef (medium fat)	20·0
Mutton (very fat)	10·2	„ (lean)	21·0
„ (medium fat)	14·5		
„ (lean)	18·0		

7. *Dried and Salted Fish*

Mackerel (canned)	13·8	Salted and smoked halibut	19·1
Salted mackerel	14·7	Salted and smoked herring	20·2
Salted and dried cod and haddock	16·0		

8. *Eggs*

White of egg	12·6	Whole egg (Atwater)	14·8
Whole egg (Hutchison)	13·1	Yolk of egg (Hutchison)	16·2

9. *Grains (Cereals)*

Wholemeal bread (Hutchison)	6·3	Wheat flour	9·5
Wholemeal bread (Atwater)	9·7	Maize	9·7
White bread (Hutchison)	6·5	Barley, buckwheat, rye (about)	10·2
,, ,, (Atwater)	8·5	Macaroni	10·98
Cornflour (fine)	6·8	Wheat	11·0
Pearl barley	7·4	Wholemeal wheat flour	12·9
Biscuits (average)	7·18	Oatmeal (Hutchison)	14·2
Semolina	7·34	,, (Atwater)	16·1
Rice	8·0	Coarse rye flour	15·3

Analyses differ very widely. It is generally agreed that arrowroot has 0·8 and tapioca 0.

10. *Fresh Fish*

Mussels, etc.	3·2	Fresh fish in general, as bought (cod, halibut, etc.)	10·5
Lobsters, crabs, etc.	4·3	Mackerel	11·4
Oysters	6·2		
Turbot	6·8		

11. *Dried Fruits*

Currants	1·2	Dates	4·4
Prunes	2·4	Figs	5·5
Raisins	2·5		

12. *Vegetables, etc.*

Marrows	0·06	Lettuce and celery	1·4
Watercresses	0·7	Sprouts	1·5
Cucumbers	0·8	Asparagus	2·2
Endive	1·0	Cabbage and spinach (about)	3·6
Leeks	1·2	Mushrooms	1·19 to 3·7
Tomatoes	1·3	Greens	3·8
Sea-kale and sauerkraut	1·4		

13. *Milk*

Buttermilk	3·0	Butter	1·0
Cow's milk (Hutchison)	2·0 to 3·0	Margarine	1·3
" " (Atwater)	3·0 to 3·3	Cream	3·0

14. *Roots and Tubers*

Carrots	0·5	Parsnips	1·4
Beetroots	0·5	Onions	1·6
Turnips	0·9	Artichokes	2·3
Potatoes	1·2		

15. *Fresh Fruits*

In general	0·5	Melons	0·7
		Blackberries and oranges	0·9
Mulberries	0·3	Plums, grapes, raspberries, strawberries, lemons	1·0
Apples, pears, currants, greengages, pineapples	0·4	Apricots and cherries	1·1
Peaches and cranberries	0·5	Bananas and figs	1·5

16. *Miscellaneous*

Sugar	0·0	Dry cocoa (average)	12·0
Dry tea, not more than	4·11	Dry chocolate	12·5 to 13·9
Soluble proteid (Bannister)	0·76 or 0·8		

CHAPTER V

Why Proteid First? What will it do for us?

"WHY is it that we need proteid? Because proteid, with its natural 'salts,' helps to form *the skin, the muscles, the nerves, the tendons, the cartilages, the bones, the blood, the cells, the digestive juices, the fat, and some of the energy; and to repair waste.* Knowing this, we see at once why it is that many 'vegetarians' naturally fail if they neglect proteid.

"It is generally agreed that proteid or albumen should be our first consideration. Professor Sir Michael Foster says of proteid that we might manage to live on it alone with the help of a few 'salts.' The pre-eminent importance of proteid is recognised by a long list of authorities, including the following:—Atwater, F. G. Benedict, A. Broadbent, Brown-Sequard, Bunge, Carpenter, Church, A. Davies, de Chaumont, Demuth, Michael Foster, Forster, Gamgee, Gautier, Haig, Haughton, Hirschfeld, Hutchison, Klein, Landois, Letheby, Lippe, Marcuse, Micko, Moleschott, Muller, Munk, Parkes, Pavy, Pawlow, Payen, Pettenkofer, Playfair, Poda, Prausnitz, Ranke, Rubner, F. Schmidt, E. Smith, Sterling, Virchow, Voit, Wicke, and Ziemssen." *

Out of a host of opinions, based on countless experiments with small or large numbers of people, there is only space to quote one or two. But if the reader wishes for others, he has only to consult any

* From "Some of My Recipes" (Routledge and Sons).

up-to-date books on food-values, and he will find the authors endorsing these views.

Professor Bunge says, "The only organic food-substances of which it can with certainty be affirmed that they are indispensable, and that they cannot be replaced by any other nutrient material."

Professor Gamgee says, 'We may be deprived of starches and yet live, of sugars and yet live. We may go without fats, but unless we have proteid we die."

After classing food-constituents as (i) tissue-formers, and (ii) work-and-heat-producers, Dr. Robert Hutchison says (in "Food and Dietetics")—

"Proteids alone are able to fulfil both the functions of a food. Without proteid, life is impossible, for the daily wear and tear of tissue must somehow be made good. With proteid, plus water and some mineral salts, life can be healthily maintained for a practically indefinite time. . . . A lack of proteid . . . leads to imperfect tissue repair. . . . Not only, I think, does a diet rich in proteid make for physical and mental energy, it seems to increase one's power of resisting disease. . . . The nervous system, too, seems to require a plentiful supply of proteid. . . . To growing children a deficiency of proteid in the diet is specially disastrous . . . the consequences may last throughout life."

CHAPTER VI

Amounts of Proteid needed daily

IT is almost universally agreed that proteid is first and foremost among food-elements. But when we come to the question, "How much proteid will you or I need daily?" we find a great divergence of opinion—a divergence greater in recent years than before. Professor Atwater's and other Tables give far too large amounts if the proteid is well assimilated. They allow for great excess and loss and waste.

Much depends on the individual—how much he ought to weigh, how much exercise he takes, how pure or how clogged his system is, how happy or unhappy he is, how slowly or rapidly he eats, what proteids suit him best, and so on.

Authorities differ considerably. Mr. Horace Fletcher, with *thorough mastication*, found half the ordinary amount enough. But here is the general opinion. At least it does not seem likely to err on the side of deficiency.

DR. A. M. DAVIES' DIET TABLES, IN OUNCES, FOR A MAN.

	At rest.	At ordinary work.	At hard work.
Proteid	2·5	4·5	6·5
Fat	1·0	3·0	5·0
Carbo-hydrates	12·0	14·0	16·0
Salts	0·5	1·0	1·5

Taking *the food of a man engaged in moderately active work*, Professor Atwater, of the United States Department of Agriculture, considers that—

A child	2 years old	needs 0·3	of this food.
A „	2—5 „	„ 0·4	„
A „	6—9 „	„ 0·5	„
A girl	10—12 „	need 0·6	„
A boy	10—11 „		
A girl	13—14 „	need 0·7	„
A boy	12 „		
A woman at light work			
A girl	15—16 years old	need 0·8	„
A boy	13—14 „		
A woman at moderately active work			

To give a very rough-and-ready rule, we might then allow an average person at least 1 *ounce of proteid at a leisurely eaten meal*, if he or she can find the proteid which he or she digests and assimilates.

If the reader will look at the chart and the notes on it, he will see how he may get an ounce of proteid. It does not follow that he will be able to digest and assimilate and get the full benefit from the whole ounce, even should he eat quite leisurely, but the chart will be a rough-and-ready guide for general use.

If cheddar cheese contains 33·4 per cent. of proteid, then $\frac{33\cdot4}{100}$, or about $\frac{1}{3}$ of cheddar cheese, is proteid, and about 3 ounces of it contain 1 ounce of proteid. According to the chart, again, we should need over 4 ounces of (raw) lentils, haricots, or

chicken; about 5 ounces of beef or salt herring; about 7 ounces of oatmeal; about 7½ ounces of egg or wholemeal flour; over 8 ounces of pork or walnuts; nearly 10 ounces of fresh fish; about 18 ounces of figs, 28 of cabbage, 33 of milk, 40 of prunes, 83 (over 5 pounds) of potatoes, 250 of apples, and an infinity of sugar!

Of course the above foods have other elements. Thus, sugar may supply fuel for fat and heat and energy, and so save proteid. But here we are speaking simply and solely of proteid-values, and we are assuming that the best-known scientists are right in their views.

In order to memorise the above order of proteid-values, it might be well for *some* readers—we should be the last to obtrude such an aid on those who can realise the list without it—to read this rhyme again leisurely until they have mastered it—

"Cheddar, lentils, haricots,
Chicken, peas, and, after those,
Beef, salt herring, oatmeal, egg,
Wholemeal flour, some parts of pig,
Walnuts, next fresh fish, then fig,
Cabbage, milk, then prunes, then roots
(Like potatoes), then fresh fruits;
In butter, arrowroot, and tea,
And sugar less and less we see
Of the body-building stuff
Of which four ounces are enough
In daily food for most of you,
If professors' words are true."

CHAPTER VII

Prices of Proteid

IF we had sixpence a day to spend on food, and wanted to be sure of proteid, *what foods would give us most proteid for our money?* Opinions differ, partly because prices differ, and partly because results differ; but here is one opinion as to the order (from cheap to dear). After each food is put a vague idea of the pennies which one ounce of proteid would cost. The food is here in its uncooked condition. The pulses here are not yet soaked, they are still dry.

	Approximate price in pence of one ounce of proteid.
Pulses (peas, beans, and lentils)	$\frac{1}{2}$
Skim milk, or skim milk butter-milk at 3*d.* a gallon	$\frac{7}{13}$
Oatmeal	$\frac{4}{7}$
Wholemeal	$\frac{9}{10}$
Milk-proteid (cheap kind)	$\frac{11}{12}$
White bread, Fine wheat flour, Potatoes	$1\frac{3}{10}$
Cheddar cheese	$1\frac{3}{5}$
Rice	$1\frac{4}{5}$
Dry haddock	$2\frac{1}{5}$
Cod	$2\frac{2}{5}$
Milk-proteid (expensive kind)	$2\frac{1}{2}$
Stilton	$2\frac{2}{3}$
Beef	3
Walnuts, Turkey	$3\frac{1}{10}$
Pork	$3\frac{1}{2}$
Egg	$3\frac{7}{10}$
Mutton	$3\frac{3}{4}$
Sweet almonds	$4\frac{1}{10}$
Milk, Filberts	$4\frac{7}{10}$
Chicken	$4\frac{9}{10}$
Carrots	$6\frac{1}{4}$
Dates	$7\frac{1}{10}$

	Approximate price in pence of one ounce of proteid.
Sprouts	$8\frac{3}{10}$
Raisins	$12\frac{1}{2}$
Prunes	13
Bananas	$16\frac{2}{5}$
Asparagus	$22\frac{7}{10}$
Foreign grapes, Raspberries	34
Plums	$46\frac{1}{2}$
Apples	$62\frac{1}{2}$
Greengages	$93\frac{7}{10}$
Oysters	$139\frac{1}{10}$

Food Value Table (by W. S. Sheppard)

1. This Table shows the percentage of proteid.
2. The price of a pound of each food.
3. The price of an ounce of proteid, given in pence and fractions of a penny.

Note.—The percentage proteid figures are from standard authorities, chiefly Atwater or Hutchison.

The price per pound is calculated at the ordinary rate as charged in shops. Needless to say, a large margin must be left for differences according to season, locality, quantity purchased, etc.

Class of food.	Proteid per cent.	Price per lb.	Price of proteid per oz. in pence.
		s. *d.*	
Milk-proteid (expensive kind)	69·0	2 6	2·7
,, (cheap kind)	37·0	0 $5\frac{1}{2}$	0·9
Cheeses—			
Stilton	23·9	0 11	2·8
Cheddar	33·4	0 8	1·4
Pulses—			
Lentils, Split peas, Haricots	23·0	0 2	0·5
Peanuts	24·0	0 2	0·5
Nuts (shelled)—			
Sweet almonds	24·0	1 4	4·1
Walnuts	12·0	0 6	3·1
Filberts	8·0	0 6	4·7
Fowl—			
Turkey	20·0	0 10	3·1
Chicken	23·0	1 6	4·9

Class of food.	Proteid per cent.	Price per lb.	Price of proteid per oz. in pence.
		s. *d.*	
Meats—			
Pork (medium fat)	12·3	0 7	3·5
Mutton ,, ,,	14·5	0 9	3·8
Beef ,, ,,	21·0	0 10	3·0
Dry fish—			
Haddock	16·8	0 6	2·2
Eggs—			
Whole of egg	13·1	0 8	3·7
Grains and cereals—			
Oatmeal	14·2	0 1½	0·6
Rice	6·8	0 2	1·8
Grain-products, flour, etc.—			
Fine wheat flour	9·5	0 2	1·3
Wholemeal flour	12·9	0 2	0·9
White bread	6·0	0 1½	1·3
Fresh fish—			
Oysters (the very best)	6·2	7 6	139·1
Cod	10·5	0 4	2·4
Dried fruits—			
Raisins	2·5	0 5	12·5
Dates	4·4	0 5	7·1
Prunes	2.4	0 5	13·0
Green vegetables—			
Asparagus	2·2	0 8	22·7
Sprouts	1·5	0 2	8·3
Cow's milk—		per pint	
Milk	3·0	0 1½	3·5
Skim milk	3·0	0 ½	0·45
Roots and tubers—		per stone	
Potatoes	1·2	1 4	1·3
Carrots	0·5	1 2	6·25
Fresh fruits—		per lb.	
Apples	0·4	0 4–1½	62·5–23·4
Bananas	1·5	0 4	16·6
Greengages	0·4	0 6	93·7
Plums (ordinary)	0·4	0 3	46·8
Grapes (foreign green)	1·1	0 6	34·0
Raspberries	1·1	0 6	34·0

CHAPTER VII

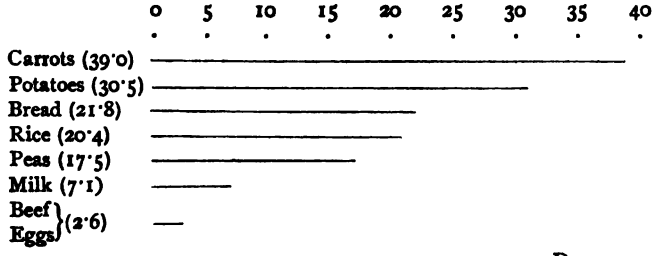
Amounts likely to be absorbed, or not

ANY general table is certain to be misleading. Dr. Robert Hutchison has given a useful guide as to the amounts of various foods supposed to be absorbed by an average person.

But we cannot in the least agree with the dictum; we are perfectly certain that in nearly all human experiments the foods were unscientifically cooked, the taste being lost, or not brought out, and the moisture being excessive; we are perfectly certain that the meals were eaten too fast; we feel fairly sure that some of the juices to digest these foods were not "in training," and were weak. Perhaps after a fortnight of practice the results would have been very different. Then there is the state of mind. Experiments are likely to be done in too grim and earnest a state of mind. This does not represent the natural condition.

Yet, for want of a better guide, I quote Dr. Hutchison's figures.

PROPORTION OF PROTEID *UNLIKELY* TO BE ABSORBED
(After Dr. Robert Hutchison)



We must bear in mind that the stomach is not the only digestive organ. Somebody's "Tonic" gives a most misleading list of how long it takes to digest food. Many others, who should have known better, have told us how much of food is absorbed, and how much is not, simply by an examination of the contents of the stomach. Allowing a certain time after the meal, they have extracted the contents by means of a stomach-pump. It is now proved that digestion goes on for hours and hours after the food has left the stomach. In the stomach little digestion goes on, except of the body-building or proteid-elements, and even these are partly digested later on by the pancreatic juice. The digestion of starch, it is proved, is begun in the mouth, and it may be continued to a slight extent in the stomach, but the main part of it is accomplished afterwards—some part of it, again, by the pancreatic juice. The digestion of that very important element—the fatty or oily element—apparently does not begin until the pancreatic juice is poured upon the food—that is to say, after the food has left the stomach. As to the "salts," I cannot find anywhere any statistics as to when they are digested, or where. So that these Tables are sadly misleading. Instead of the two or three hours in which they say that certain foods are digested, we must allow seven, eight, ten, or even more hours; exactly how many no one knows.

Indeed, the test by analysing foods taken from the stomach is a most unsatisfactory one. No scientist can tolerate that as the sole test, though

it may give us a few useful facts and hints. There is only one satisfactory test—that is by the excreta; and even that is liable to error. But, at any rate, without this test it is utterly impossible to say how much of any given food or element was absorbed by the system, and how much was passed through the body almost unchanged, yet perhaps at great expense of energy.

Some foods have the reputation of being badly digested. It is not always their own fault that they have this unenviable name.

Here, once more, individuality is the chief factor. I have two friends who never, under any conditions, have been able to digest lentils. A relation of mine can never digest skins of any sort. An acquaintance of mine can never digest seeds, or a single seed, such as we find in seed-cakes. Others have a vital objection to other elements. I know a good all-round athlete who finds that a banana suits him excellently when eaten for breakfast; his daughter is usually upset by a banana eaten at breakfast, or any other time. So that here my remarks must be of the most general kind. Any individual is liable to find any statement inappropriate for his or her case.

First of all, things eaten or drunk very fast are liable to be indigestible. This is not a universal rule. Some people enjoy their food so much, and have such wonderful gifts in the way of digestion, that we cannot be sure that fast eating or drinking, even of very hot or very cold things, will hurt them; but, to take an extreme case, it is bad for most

people to eat very hot or very cold things very fast. Starchy and sugary things—such as porridge and sugar—are likely to hurt them also, unless they are carefully masticated. It is interesting to note that the average number of bites for a mouthful of porridge as eaten by five hundred of my health-pupils was less than three, whereas it should have been upwards of thirty.

And hurry after a meal may make things indigestible. Fatigue before a meal, and dull work or severe exercise after it, are among the worst conditions for digestion.

We must also bear in mind that digestion is not the only virtue within us. Take, for instance, the flesh-foods. I used to digest them admirably. Curiously enough, lobsters never disagreed with me. But, however splendidly digested they were, they were bad for me; they did not cause indigestion, but they had in them elements which constipated me, and elements—either the same or different—that clogged me generally, and made me uncomfortable. These are often called the purins; they abound in flesh-foods and in certain other foods.

And even indigestion is not necessarily felt directly after a meal, or felt locally at all; it may appear as a general feeling of slackness or of restlessness, or as a headache, or as a cold, or as asthma; it has lots of ways of showing itself. It may work through the sympathetic nervous system; it may work through the pneumogastric nerve, which communicates between stomach, lungs, heart, and gullet.

Then, again, things which are indigestible to one

person at one time may be digestible for another person at another time, or for the same person if he has what we may call "counteractions"—for instance, the right kind of exercise, the right kind of massage, the right kind of water-treatment, perhaps something hot held to the stomach; or, if he takes certain drugs, such as bicarbonate of soda or bicarbonate of potash. But, for most of us, these things must be regarded only as makeshifts. We should search for meals which we can digest even under the most unfavourable conditions. Of course, when it is convenient, we can make our little mistakes, and counteract them afterwards in some way or other. The old Roman habit of tickling the throat with a feather after a meal was in many ways an extreme and a disgusting one, but it had something to be said for it; perhaps it was a better extreme than keeping the mass of foods inside; on the other hand, it would have been better not to have eaten the excess at all.

A word here as to the ill-fame of two sets of food that are very rich in proteid and other elements —namely, cheeses and nuts.

In theory, some cheeses (such as Parmesan) contain far more proteid than beef; so may some nuts (such as almonds). Naturally, then, they should be regarded *not* as extras to come *after* a nourishing meal, but as among the essential parts or members of a meal. They should come early.

Moreover, the right kinds should be chosen—dry cheeses suit some, moist cheeses suit others; filberts suit some, Brazil nuts suit others.

And either they should be very thoroughly masticated, or else they should first be prepared by being grated or "milled," or—in the case of nuts—pounded.

Under such conditions I find that they hardly ever disagree with people. It is when eaten fast at the end of an already ample meal that they are most likely to disagree. Regard them as nutriment, worth eating early in the meal, worth eating leisurely, and probably you will find them very valuable foods.

CHAPTER IX

What besides Proteid?

PROTEID—enough proteid of the right sort and rightly prepared for the individual, and then rightly eaten—seems to be the prime essential in our food-supply. But, needless to say, it is not complete food in itself. It needs helpers and supplementers.

While we have no wish to underestimate the importance of these helpers, yet, for the sake of clearness, we have decided to give up most of the space in this little book to proteid. The other elements in various foods may be, approximately, as follows. (For the "salts," see the next chapter.) The analyses in Dr. Hutchison's book have been quoted, as a general rule.

TABLE OF OTHER ELEMENTS BESIDES PROTEID

	Fat or oil.	Carbo-hyd-rates (sugar, starch, etc.).	"Salts."	"Ex-tractives."	Water.
FLESH-FOODS—					
Beef (medium fat)	1·5	—	1·3	1·9	75·9
Mutton (medium fat)	19·5	—	0·8	—	65·2
Veal	11·0	—	1·0	—	71·0
Pork (medium fat)	26·2	—	1·1	—	60·9
Pork sausages	21·04	1·05	3·52	—	54·99
Fresh fish (average)	2·5	—	1·0	42·0 (waste)	44·0
SOUP—					
Pea-soup	0·93	—	—	0·70 (cellu-lose)	88·26
MILK AND MILK-PRO-DUCTS—					
Milk	3½–4½	4·5 (sugar)	0·7	—	87·88
Cheddar cheese	26·8	—	3·9	—	31·9

TABLE OF OTHER ELEMENTS BESIDES PROTEID—*continued.*

	Fat or oil.	Carbo-hydrates (sugar, starch, etc.).	"Salts."	"Extractives."	Water.
EGGS—					
White	0·25	—	—	—	85·7
Yolk	31·75	—	—	4·149 (some nuclein, etc.)	50·9
CEREALS OR GRAINS AND GRAIN-PRODUCTS—					
Wheat	1·7	71·2	1·9	2·2	12·0
Hovis	1·6	42·3	1·2	(small)	45·0
Oats	4·5	59·1	3·5	12·0	10·0
Oatmeal	7·3	65·9	1·9	3·5	7·2
Rice	2·0	76·8	1·0	—	12·0
(with husk)	1·6	68·1	4·0	9·0	10·5
(boiled)	0·1	41·9	0·3	—	52·7
Wholemeal bread	1·2	44·8	1·2	1·5	45·0
White bread	1·0	51·2	1·0	0·3	40·0
Crust	1·18	67·44	1·21	—	17·15
Crumb	0·70	44·25	0·84	—	44·45
Macaroni	0·45	76·05	0·64	0·28	12·00
PULSES—					
Dried peas	1·8	55·4	2·6	6·0	13·0
Lentils	2·0	58·4	2·7	2·0	11·7
Haricots	2·3	55·8	3·2	4·0	11·7
(cooked)	0·5	20·8	0·7	—	73·6
ROOTS AND TUBERS—					
Potatoes (boiled in skin)	0·1	19·1	0·9	0·6	76·7
Turnips	0·15	5·0	0·8	1·8	90·3
Beetroots	0·1	11·0	0·9	3·0	83·9
Onions	0·3	6·3	0·6	2·3	98·1
SALADS, VEGETABLES, etc.—					
Cabbage	0·4	5·8	1·3	1·1	89·6
Spinach	0·5	3·8	1·7	0·9	90·6
Tomatoes	0·2	5·0	0·76	1·5	91·9
Lettuce	0·4	2·6	1·0	0·5	94·1
Celery	0·1	3·3	0·9	0·9	93·4
Cucumber	0·1	2·1	0·4	0·5	95·9

TABLE OF OTHER ELEMENTS BESIDES PROTEID—*continued.*

	Fat or oil.	Carbo-hydrates (sugar, starch, etc.).	"Salts."	"Extractives."	Water.
FRUITS—					
Apples	—	12·5	0·4 (Acids, 1·0)	2·7	82·5
Plums	—	14·8	0·5 (Acids, 1·0)	4·3	78·4
Cherries	—	10·0	0·6 (Acids, 1·0)	3·8	84·0
Gooseberries	—	8·9	0·5	2·7	86·0
Currants	—	7·9	0·5 (Acids, 1·4)	4·6	85·2
Strawberries	—	6·3	0·7 (Acids, 1·0)	2·2	98·1
Blackberries	—	2·3	0·6 (Acids, 1·4)	5·2	88·9
Grapes	—	(15·0) 15·5	0·5 (Acids, 0·5)	2·5	79·0
Bananas	—	22·9	0·9	0·2	74·0
Oranges	—	8·7	0·6 (Acids, 1·25)	1·5	86·7
Lemons	—	8·3	0·5	—	89·3
Dates (dried)	—	65·7	1·5	5·5	20·8
Figs (dried)	—	62·8	2·3 (Acids, 1·2)	7·3	20·0
Prunes (dried)	—	66·2	1·5 (Acids, 2·7)	—	26·4
Raisins	—	74·7	4·1	—	14·0
NUTS—					
Chestnuts (dried)	10·0	—	2·7	—	5·8
Walnuts (dried)	62·6	7·4	2·9	7·8	4·6
Filberts (dried)	66·4	9·7	1·8	3·2	3·7
Sweet almonds	54·0	10·0	3·0	3·0	6·0
Cocoanut (dried)	57·4	31·8	1·3	—	3·5
COCOA—					
(bean, dry)	50·44	4·20	2·75	6·40	5·23

The functions of these elements seem to be as follows:—

1. *Fats* (and oils and butters), to give fat and heat and energy, to spare proteid, and sometimes to help excretion.

2. *Carbo-hydrates* (starches and sugars), to give fat and heat and energy, and to spare proteid; these are weaker but faster fuel than fats and oils.

3. "*Salts*" (phosphates, etc., not the same as table-salt), to build the body, to help digestion, to help excretion, to stimulate, to counteract poisons, etc.

There seem to be needed, also—

4. *Appetite, or taste*, to attract, to arouse saliva, to arouse gastric juice, to help pleasant emotions.

5. *Water* (especially pure and soft), to build the body, to carry materials, to carry and remove waste.

6. *Cellulose* (or fibre), to give sense of satisfaction, to give work to the organs, and to help excretion; not necessarily needed at all meals.

7. *Bulk*, to give sense of satisfaction, to give work to the organs, and to help excretion; and to give faith! not necessarily needed at all meals.

8. *Purity, or excretion-helps*, see above.

9. *Adaptation to the individual.*

10. *Economy*, including freedom from excess.

11. *Sufficiency.*

12. *Leisurely mastication, and sensible poise of mind and body.*

CHAPTER X

Notes on "Salts"

THE word "salt" brings to our mind one kind of salt—table-salt, which is not from the plant world, but from the inorganic world. There are many other "salts," and the word is used here in a wide sense.

Comparatively little is known about the "salts" which are to be found in every normal human body. All the "salts" are generally dumped together, whether they are iron or phosphoric acid, and whether they are acid or alkaline. Few people seem to know how important they are, and no one knows exactly what processes go on in the body. People see results, but cannot prove how these results are brought about.

It seems certain that "salts" form part of the bricks of the body—that is to say, the material or fabric of muscle, nerve, and bone. They are found everywhere as a part of the body's bricks. When the body or any part of it—say the liver—degenerates, certain "salts" are found lacking.

Besides being the bricks, they are to some extent the builders as well; they help us to digest and assimilate our food.

Then they are also tonics to the system and its processes.

Undoubtedly some of them are cleansers and coolers, and, more generally, regulators, bringing the body nearer to health if they can; though there are some "salts" that have precisely the opposite effect. They help to destroy bricks; they hinder the

builders; they are not tonics, but depressants; they are not cleansers and coolers, but cloggers and heaters; they tend to upset the work of the body.

By way of introduction it may be well to quote some exaggerations from a recent work on health. The vegetables and fruits cannot be guaranteed to do as they are supposed to do. In the first place, to swallow them is not enough—we must absorb them. I have known whole pieces of vegetable and fruit pass through the body unused; they did more harm than good—they set up irritation and fermentation, and gave the system all the work of expelling them. Much will depend on the pace of eating. Again, much will depend on the way of cooking. If a cook takes potatoes and cabbages, and boils out many of their precious juices, and pours these down the sink, then we cannot claim the grand medicinal qualities for what she serves at the table. Thirdly, individuals differ—strawberries are one man's cure, another man's curse. But we quote the exact words, as they are striking. They, like food, must not be bolted without meditation!

"The virtues of vegetables are innumerable. Celery is invaluable as a food for those suffering from any form of rheumatism, for diseases of the nerves and nervous dyspepsia.

"Lettuce is useful to those suffering from insomnia.

"Watercress is a remedy for scurvy.

"Onions are almost the best nervine known.

"Spinach is useful to those suffering with gravel.

"Asparagus is used to induce perspiration; carrots are helpful to sufferers from asthma.

"Turnips serve for nervous disorders and for scurvy.

"The tomato I class as one of the kings among wholesome fruits . . . it is not only a tonic, which contains iron in a form

that is useful in the animal economy, but in some measure an antiseptic and a narcotic; it stimulates the appetite, and in the summer cools the system.

"To the sweet fruits a special hygienic virtue is ascribed, particularly to the plum, as a remedy in rheumatism of the joints or as a preventive of gout.

"The acid class is the largest, including as it does raspberries, strawberries, peaches, apples, gooseberries, cherries, lemons, and oranges. All these fruits are prescribed for 'stomach troubles.'

"In many cases of nervous and other kinds of chronic illnesses a course of judiciously chosen fruit may be taken with almost certain benefit.

"The ripe fruits of our own country are best at their season, and the best time to eat them is about half an hour before breakfast, and just after dinner if that meal has not been a heavy or too hearty a one.

"In the early morning the stomach is, or ought to be, empty, and the fruit juices have then a good opportunity of quickly entering and purifying the blood, stimulating the liver and kidneys, as well as the pancreas. After dinner they enter the blood with the food, and again do good. Unripe or over-ripe fruit is poison, however.

"Tomatoes are beyond all praise, and may be eaten ripe and raw thrice daily.

"But let me remind the reader that if he goes in for a course of fruit, this fruit must be taken as regularly as if it were medicine —which indeed it is, and that, too, the best and safest.

"Fresh ripe fruits are excellent for purifying the blood and toning up the system.

"As specific remedies, oranges are aperient.

"Water-melon for epilepsy and yellow fever.

"Lemons for feverish thirst in sickness, for biliousness, low fevers, rheumatism, colds, coughs, liver complaints, etc.

"Tomatoes are a powerful aperient for the liver, and a sovereign remedy for dyspepsia and indigestion. They are invaluable in all conditions of the system in which the use of calomel is indicated.

"Figs are aperient and wholesome. They are said to be valuable as a food for those suffering from cancer, when they are used externally as well as internally.

"Bananas are useful as a food for those suffering from chronic diarrhœa.

"Apples are useful in nervous dyspepsia, they are nutritious, medicinal, and vitalizing, aid digestion, clear the voice, correct the acidity of the stomach, and are valuable in rheumatism, insomnia, and liver troubles. An apple contains as much nutriment as a potato, in a pleasanter and more wholesome form.

"Grapes dilute thick blood, send the circulation to the surface, remove obstructions from liver and lungs, dissolve and dislodge gravel and calculi, and bring the stomach and bowels to a healthy condition.

"Honey, I may add, should be far more popular than it is. It is not only softening to lungs and throat, thus giving extra voice power, but it is a tonic and a delightful pick-me-up. The best honey is that from the heather.

"Those who are troubled with the liver or kidneys can hardly use too much of these—apples, good oranges, grapes, lemons, tamarinds, dates, tomatoes, and all and every British fruit in season, especially gooseberries, strawberries, and pine-apples. How sorry I am, truly so, that fruits on the whole are so dear, and, therefore, beyond the pale of the working-classes, who had better never buy them than buy bad.

"For rheumatism fruits are essential, especially apples and pears; for nervousness also, and in many complaints peculiar to girls and women, such as hysteria or St. Vitus's dance.

"Gout, too, may be kept at bay by substituting well-chosen fruit for the nerve-destroying nips of brandy and the bucketfuls of beer in which some indulge.

"Finally, let me add that fruit is an essential for the purity of the blood in winter as in summer, and those who care for apples may eat them almost *ad lib.*, either raw, cooked, or in pies.

"A roasted apple or two, taken about half an hour before breakfast, are, almost in themselves, a cure for constipation. They stimulate the liver in a far less dangerous way than anything I can think of. Moreover, they cool the blood, and consequently calm the mind.

"Apples contain malic acid, which has the power to destroy uric acid, which produces both rheumatism and gout. They are said by some medical men to cure the drink crave. Of this

I have no surety; anyhow, they are worth a trial. Apples, I may add, will give good nights and quiet sleep when nothing else will without injury to the system."

Passing from these confident assertions to the various elements, we cannot enter into the whole complex question. We can only select a few "salts" —potash, alkaline phosphates, lime, iron, and soda— and refer to Broadbent's "Building of the Body" for details.

Many of our commonest mistakes in choosing and preparing foods are because we do not know where the "salts" are, or, rather, where they abound. In some foods they abound in the husk. There may be four times as much valuable "salts" in the husk as in the body of the grain, or fruit, or root, or tuber. Hence, it may be wasteful to peel barley, rice, wheat, etc., unless we boil the husks, and then use the virtue out of them. So it may be waste not to use the skins of apples and other fruits. These skins contain very valuable "salts." In making an apple-pie, we should add to it the juice extracted from the skin by boiling. By boiling and peeling we fail to use a great deal that might help to build our body and to keep it clean and fit.

With regard to boiling out, the first "salts" to go are the potash and alkaline phosphates. "Whole potatoes may contain 37 grains of potash. Peeled, soaked, and boiled potatoes may contain only 22. There will be left in the peeled and soaked and boiled potato the less soluble 'salts' of lime and magnesia."

Potash and alkaline phosphates are the "salts" most easily washed out of foods. "In some body-tissues

which have been examined—including the tissues of children—only about half the right amount of potash and phosphates have been found." Without these "salts" the organs were weak. Mr. Broadbent compares them to fossil organs, which may have the right shape, but are not living.

Potash is well known as a preventive or cure of scurvy and other skin troubles.

Mr. Broadbent's Table gives the grains of potash and phosphorus in a pound of various fruits. Notice two points here—first, that bran is extraordinarily rich in phosphoric acid; then, that by merely putting the bran into our bodies we do not necessarily use all that phosphoric acid. It is not enough to eat, we have to extract and assimilate. It may be better to boil the bran, and Mr. Broadbent advises a good tablespoonful of bran per head. If you put it in a little muslin bag and leave it to simmer in the water, the extract will be rich in potash and soluble phosphates.

GRAINS OF POTASH AND PHOSPHATES PER POUND (BROADBENT)

	Potash.	Phosphoric acid.
Bran	93·1	201·6
Beans	80·5	55·3
Peas	68·6	61·6
Rye flour	45·5	59·5
Cabbage-heads	42·0	14·6
Barley flour	40·6	66·5
Potatoes	39·2	12·6
Beets	30·1	5·6
Oatmeal	29·4	38·5
Carrots	22·4	7·7
Turnips	21·0	7·7

"The fruits best to use are, in order of richness," says Mr. Broadbent, "strawberries, greengages, plums, pears, and oranges; and of vegetables, rhubarb, celery, lettuce, endive, watercress, and dandelion.

"Vegetables of all kinds should be cooked in soups only, for the water gets the *quality* of the vegetable, though the solid part may retain the quantity. Dyspeptics who say they cannot eat vegetables will find the strained soup of them quite light, easily made pleasant, and of more value to them by far than the boiled vegetable itself. Vegetables also contain these 'salts' in abundance, and, if you keep these 'salts' when you cook the vegetables, you will have no need to add the quantities of soda [and salt] in which cooks delight."

Lime is important in forming the bones. It is said that the bones of old people are fragile because they lack lime. Here we quote Mr. Broadbent again—

"Ordinary food is also deficient in lime. It is Dr. Lahmann's opinion that rickets, stunted, irregular teeth, the tendency towards disease of the bones generally, may be traced to an insufficient supply of lime salts in the food.

"Salad food is rich in lime as well as soda. For example, onion has 22, cabbage-lettuce 14, radish 14, celery 13, turnips and carrots 11, eggs 10, cereals 2 to 3, flesh 2, poultry 3 per cent. of the total analysis of the ash."

Salads and properly cooked vegetables give the body abundance of lime and *soda*. The vegetables that have most soda are spinach, endive, radishes,

carrots, dandelions, and lentils. Part of the work of the soda is to get rid of the poisons which the body produces in itself by its work, or else introduces into itself by wrong food. Lahmann says, "Blood which contains too little soda cannot regulate the gas-exchange of the blood and of the tissues; an excessive accumulation of carbonic acid takes place in the body, the oxidation, that is, the manufacture of carbonic acid, being comparatively unhindered, whilst the excretion of carbonic acid is rendered difficult."

But, here again, much depends on the quantity of soda that you can assimilate; it is not enough to put things containing soda into the body.

We hear a great deal of talk about *iron* and its value in the body. We are told that it increases the hæmoglobin in the blood, and so prevents or cures anæmia; pale-faced people are often given iron. Now it does not in the least follow that this iron of a mineral kind will become useful iron and hæmoglobin in the blood. There may be kinds that do. Many kinds certainly do not. On the other hand, there is no doubt, as Gustav Bunge showed as early as 1891, that the mineral salts in some plants are soluble and organic. Bunge gave the following quantities, reckoning the number of milligrammes in a hundred grammes of material:—

	Milligrams in 100 grams.
Bran	8·8
Whole wheat	5·5
Rye	4·9
Whole barley	4·6
Wheatmeal	1·6
Peeled barley	1·4

Sugar is an acid, and may serve as a stimulant, and also as a heat- and energy-producer. Although most kinds of sugar disagree with certain people—for instance, with myself—yet, with certain other people, sugar may be very valuable for a short time. Some years ago tests were made in Zuntz's laboratory at Berlin. The conclusion which was accepted by the Prussian War Office was that "sugar in small doses is good in helping men to get through extraordinary muscular labour. On long marches it was found to prevent or remove hunger, thirst, and fatigue." There is no doubt that sugar is more rapidly assimilated than starch, just as starch is likely to be more rapidly assimilated than oil.

What about *Table-salt?* In one week I remember receiving two letters. The first was from some one who had given up table-salt altogether, getting his "salts" from salads, vegetables, etc. He said that, since he had begun to give up salt, he had been entirely free from colds and other complaints. The second letter said that, since the person had taken salt dissolved in water every morning long before breakfast, he also had been free from colds and other complaints. How can these two results be reconciled?

In the first place, there may be a difference between dry salt and salt dissolved in water, between dry salt eaten with food and salt taken with water before a meal. The salt may be an irritant, and may help the system to get rid of some of its poisons. It may do harm as an irritant. It may do good as an

excretive. Pure-blooded people would not need an excretive.

But one thing is certain, there is plenty of the element, in which table-salt is rich, in salads, vegetables (properly prepared), grain-foods or cereals, and fruits, as well as in milk; and many do far better without any salt at all beyond what they get as a matter of course from these supplies.

Dr. Haig has written a large volume on *uric acid* and its sources. Dr. Walker Hall has improved on Dr. Haig's theory. While admitting that these acids—which he calls *purins*—are bad for the body when they are kept in the body in excess, he says that different people have different capacities for putting up with or getting rid of the excess. Anyhow, the mistake is not so much the presence of the purins as their excess.

It does not in the least follow that, because a food contains 3 grains of purins in every pound, and another food only 1 grain, therefore the first food will be three times as bad as the second. Many other factors come in, which Dr. Haig apparently would deny. For my own part, I find that a little extract of beef will give me cramp. To beef would be assigned 7 or 8 grains of purins to a pound. Five times that quantity of haricot beans produces no cramp that I can detect, though a pound of haricot beans contains over 4 grains of purins. In fact, the chemical analysis is very misleading. We only offer it here, from Dr. Walker Hall's work —called "The Purin Bodies in Foods" (Sherratt and Hughes)—for what it is worth.

With regard to eggs, some distinguish between the white and the yolk; others distinguish between fresh and stale eggs. The latter, they say, do contain purins, perhaps partly because the embryo animal has been using up food and excreting waste, which is still left in the egg as purin. Milk contains so little, and so does cheese, that, as far as purins go, they may be regarded as having none worth mentioning. On the other hand, there are some who hold that to take too much proteid means that the excess of proteid becomes purin. This may be so in certain cases.

DR. WALKER HALL'S TABLE OF PURINS

Undried Purin in Flesh Foods, Fish, and Poultry

	Grams per kilo.	Grains per lb.
Fish—		
Cod	0·582	4·074
Plaice	0·795	5·565
Salmon	1·165	8·155
Meats—		
Mutton	0·965	6·755
Veal	1·162	8·137
Pork—		
Loin	1·121	8·487
Neck	0·567	3·969
Ham (fat)	1·155	8·085
Beef—		
Ribs	1·137	7·959
Sirloin	1·305	9·135
Steak	2·066	14·455
Liver	2·752	19·264
Poultry—		
Chicken	1·295	9·065
Turkey	1·260	8·820

DR. WALKER HALL'S TABLE OF PURINS—*continued.*

Purin in Vegetable Foods

	Grams per kilo.	Grains per lb.
Oatmeal	0·5300	3·4563
Peameal	0·3900	2·5413
Beans, haricot	0·6375	4·1661
Potatoes	0·0200	0·1400
Onions	0·0900	0·0630
Asparagus	0·2150	1·5050
Tea	Dr. Haig, grains in a dry lb.	0·175
Coffee		0·700
Cocoa		0·590
Lager beer	0·1250	1·0955
Pale ale	0·1450	1·2708
Porter	0·1550	1·3578

This table seems to cut us off from three favourite drinks—tea, coffee, and cocoa—if we really wish to avoid purin-foods altogether. *What is left for us to drink?* Even beer, though not rich in alcohol, becomes objectionable. We shall speak of alcohol directly.

Very few people know how refreshing a drink may be made of extract of vegetables, taken either hot or cool. It is far less poisonous than the patent meat-extracts so largely advertised. It is rich in valuable "salts."

Another good drink is barley water, made from whole barley rather than peeled barley. A little lemon may be added to it; the less sugar the better.

The same applies to the strained water in which apples have been allowed to simmer for a long while. This may be far healthier for people than cider, because of the alcohol in the cider.

Buttermilk is another good drink if it agrees. Buttermilk made from skim milk is one of the cheapest forms of food in existence.

Then there is a good drink to be made from wholemeal or brown bread roasted. Let this be put in boiling water and allowed to simmer, and you will get a drink not unlike coffee.

Another drink is bran-tea. Mr. Broadbent recommends that people should boil out the bran, and use the liquid when they make white bread, if they still insist on using white bread.

Against white *bread* is the fact that it has less fibre than wholemeal; that it gives less work to the teeth, and arouses less saliva; that it may produce constipation; and that it certainly has far less "salts," since the bran has been removed. One pound of white bread has 20 grains less of potash than 1 pound of brown bread has.

It is important to remember that *the crust is better food than the crumb.* It is better cooked; it is dryer; it has more "salts;" it has more proteid; it is more easily digested. The crust which the beggar refuses, the intelligent person will prefer to the crumb. It is a strange thing, as we have already said, that the part which the beggar despises most is the part which would feed him best.

Against *alcohol* many statements have been brought forward in recent years. It may have a pleasant taste; it may have pleasant, immediate effects; applied to the skin, it may be cooling and antiseptic.

But against it is the undoubted expense, especially

if the dose is increased from time to time, and if the luxury becomes—except for the very strong-willed—a necessity.

If alcohol is to be considered as a food, it must certainly be considered as a very poor food—for those who are well, as distinct, perhaps, from those who are feverish.

Quite apart from the impurities which it contains in many of its cheap forms, it is said to shrivel the red corpuscles in the blood. It is these corpuscles that carry the oxygen and so purify and invigorate the body.

Probably most of us have seen glaring pictures of its supposed effects, especially in the case of drunkards. We are told that it paralyses the digestion unless it be taken in very small quantities; that it irritates and sends into a kind of fever the organs not only of digestion, but also of excretion, such as the stomach, liver, spleen, and kidneys.

For other disadvantages of alcohol we must refer to the "Physical Educator," in which we have tried to give a fair estimate of the *pros* and *cons;* but, whatever may be said in favour of alcohol, against it must always be brought, in the first place, the huge cost of it, considering how little nourishment it contains, and, secondly, the loss of self-control which so many alcohol-drinkers show, and with it a corresponding loss of self-respect.

CHAPTER XI

Length of Digestive Processes

MANY years ago a hunter had part of his stomach exposed by a shot. Dr. Beaumont was able to examine the stomach of this man, Alexis St. Martin, under different conditions: for instance, when different foods and drinks were taken. He collected his statistics fairly, then published them; and, partly on the basis of this, ignorant people have compiled Tables which are supposed to tell you how many hours—two, three, or four—it will take you to digest any given food.

Now, there is a gigantic fallacy here. First of all, the stomach is only one of our digestive organs. It has the capacity for digesting the proteid by means of the gastric juice. But it does not entirely digest the proteid. And, even if we considered the proteid alone, we should have to alter that Table now that we know for how many hours the gastric juice goes on pouring into the stomach after we have eaten food. The experiments of Pawlow with dogs are most instructive in this respect. Sometimes the gastric juice would flow for five or six hours; it would not do so unless there were work for it to accomplish. We take it for granted, then, that the stomach might need at least five or six hours to do its work upon the proteid. Then afterwards the pancreatic juice deals with that proteid still further.

Besides this, there is the digestion of starch. This begins, it is true, when the food is broken up

and mixed with saliva—in case of proper mastication —in the mouth, but the process goes on for hours afterwards. A great deal of it is neglected by fast eaters, and is left to be completed, if it ever is completed, by that overworked pancreatic juice again.

As to the oil, or fat, apparently, except for the slight change in the mouth, it is not digested at all till quite a late stage in the process ; it also is dealt with by the pancreatic juice.

Then there are those mysterious "salts" (acid and alkaline), the phosphates, etc. Some help in the work of digestion ; others become parts of the body, after becoming parts of the blood. When are they digested ? No one knows.

In a word, the Tables so often put before the public are utterly misleading.

Beyond what is known as digestion, there is the further work of assimilation. It is not enough for the stomach to be empty, though so inadequate is the above Table that the stomach in many cases is not empty—at least entirely empty—of its contents for days afterwards. But suppose that all the organs were as nearly emptied of their contents as we could expect, even then the food has to be assimilated ; it has to be turned into blood, and the blood has to be turned into other elements.

Instead, then, of allowing some period between one and four or five hours for the whole process of digestion, the science of the future may fix the full time as rather nearer to twelve or even sixteen hours, or more hours.

This question has a very practical bearing. If

you assume that your evening meal, finished, let us say, at eight o'clock, is digested in two hours, or three hours, then it seems that you must need a breakfast the next morning; but allow the digestion to go on all night, as it certainly does in ordinary cases, and allow it, with the assimilation, to last sixteen hours or more (there is nothing against this theory at present), then surely, while that process is going on, it would be a mistake to ask your digestion to do further work, especially if you are calling upon your energies for muscle-work or brain-work during the morning. In other words, the scientific plan for *most* people *may* really be not to take breakfast, but to allow an interval of sixteen hours or more between the last meal of one day and the first of the next. So far as I can collect statistics, this plan, or the very light breakfast plan, suits at least four people out of five who have tried it fairly. It has seldom suited any one for the first few days; it is only after three days up to a week that it begins to be a benefit. Nor does it suit every one, as certain cranks maintain. I know of a good many absolute failures.

Some have rapid digestive and assimilative powers. Possibly such people have rapid mental powers corresponding to these. For them it may be better to have more meals than one or two, or even three. And then there is the habit-hunger, the desire for food at certain times, because at those times the body has often been fed. It may be partly due to fermentation. It is no proof of healthy appetite. On board ship the first saloon passengers may become acclimatised to seven or eight meals a

day, and crave for any one that they miss. This is not necessarily a normal desire.

Anyhow, while the process of digestion and assimilation is going on, and requires—perhaps in the intestines—some of the blood and nerve-force or energy, it may be a mistake to call the blood and energy elsewhere, as we do not only when we take exercise or work with our brains, but also when we send much food to the stomach. There may be cases in which the morning power—say at 11 a.m.—is being dissipated between (*a*) the arrears of digestion and assimilation of the last night's meal; (*b*) the brain-work in the badly ventilated office; and (*c*) the digestion of the recent breakfast. This, on the face of it, is burning the candle at both ends.

CHAPTER XII

Ordinary Meals estimated

IT is more effective to teach by examples, to begin with, than by vague principles. Here we shall go through an ordinary breakfast, in imagination, and point out what elements in it may be useful, what may be harmless, what unnecessary, what harmful. The object is not to make any one fussy. There is a happy mean between sensible forethought and self-conscious fussiness. You are not compelled to avoid absolutely whatever is in the least harmful, and, indeed, perhaps certain things will not be harmful to you; but you will get a general guide as to what it may be safer for you to avoid, at any rate in large quantities.

Much will depend on individuality. In this meal I should certainly find the porridge, cooked in the ordinary way, and the sugar and the coffee, and the egg and the bacon and the mustard, all disagree with me. More than this, I should prefer not to have any solid breakfast at all. However much work or exercise I had to get through in the morning, I should do it better without previous solid food. Much also will depend on the mastication, which will divide up the food into easily digestible morsels, will help to digest starchy foods, to neutralise undesirable acids, and so on. Much also will depend on the state of mind, the freshness of the air, and so forth.

Now, picture yourself seated at the breakfast-table

under ordinary conditions. There is a dish of porridge, which you eat with sugar and milk—you take about two or three bites to a mouthful which, owing to its starch, demands thirty; you drink coffee or tea, also with sugar and milk; then you have white bread and butter; afterwards you add marmalade to it, but first you eat with it an egg and salt. The egg may be poached, and perhaps be served with bacon; in that case you are likely to take mustard as well. Let this be the sample breakfast.

How much of it is useful—at least in theory? For, after all, we know very little about the body and its ways of working and using things.

It is said that the most useful element is the body-building, or proteid. This book chiefly deals with that element in food. You get that element in the porridge, in the milk very slightly, in the white bread, in the egg, and in the bacon. The Tables will show you about how much you get. In the porridge, by the way, you are not getting 13 per cent. of proteid, for the porridge is freely mixed with water; you may be getting only 6 (or less) per cent. Perhaps, in respect of proteid, the meal may be nearly right.

Certainly in heat- and energy-giving ingredients it is very rich. Most of the articles contain these—porridge, sugar, milk, white bread, butter, marmalade, and fat bacon. Here you are more likely to suffer from excess than from deficiency.

As to the mysterious "salts," you have table-salt, but its exact value is unknown. Perhaps it never

builds the body at all, but only serves other purposes, such as counteracting or getting rid of over-acidity. But useful "salts" will be found in porridge, milk, and egg. On the whole, however, there will be a lack of alkaline "salts," and a lack of certain other "salts," in the white bread particularly, and a superabundance of acid salts owing to the "purins" in the bacon (and possibly in the egg also), and in the coffee or tea.

There may be a deficiency of fibre or cellulose, too, if the porridge be too fine; for white bread will contain little or none, and fat bacon will not contain much. The other articles of food have practically none. The fibre is supposed to help the digestion and excretion, and to give a sense of satisfaction. You could easily get it from fruit, or from wholemeal instead of white bread.

As to the taste, I suppose you will find it satisfactory—most people seem to; and that will help the digestion.

There will be enough water, too, to convey the food from place to place within the body.

As to the harmless elements, or the comparatively harmless elements, they will include the bulk or weight, the fibre or cellulose, the taste, and the water.

But in the meal there may be excess of these elements, which will over-tax and over-irritate the system. Every individual, by the way, seems to have some immunity, some power to tolerate excess, perhaps even to profit by it; and a certain amount of excess may be good practice, as it were, in self-defence, a sort of training in case of future needs.

But most of the bulk may be unnecessary, and especially the bulk of starchy material and sweet material from the porridge, sugar, white bread, and marmalade.

Some of this white starch may be positively harmful to many. You must concede a little to social convenience; you do not like to refuse to eat any white bread at all; you do not wish to be thought a crank. But, making due allowance for this, there may be in this meal a good deal which is harmful to you.

First, there may be too much bulk, too much material that will ferment. Porridge and sugar and white bread may all have this effect. The fermenting stomach will be filled with gas, and will press up against your diaphragm, and hence against your heart and lungs above, upsetting their work and rhythm; and down upon your colon below, upsetting your excretion.

Besides, the bacon—and possibly the egg—may contain those "purins" of which we have spoken, stimulating, indeed, to some, but, in the end, clogging and over-heating to many.

And, indeed, there may be too much stimulant, too much narcotic, in the meal. Sugar and tea or coffee may be stimulant or narcotic to many.

Undoubtedly the meal is not a cheap one. Whatever it may cost, you will find it possible to get the same amount of useful and harmless elements from other sources at a quarter of the price.

Suppose, instead of this meal, we take a midday or evening meal of meat and beer, and potatoes

and greens, cooked in the ordinary way. We could divide that in the same manner into useful, harmless, unnecessary, and harmful ingredients. The proteid and some "salts" in the meat, and some fattening material and "salts" in the vegetables, might be useful. Some water and bulk might be useful or harmless, or might be unnecessary. Among the elements harmful to many, one would reckon the "purins" in the meat, the alcohol—and perhaps some undesirable chemicals—in the beer, and one would also have to notice that the "salts" were over-acid, the alkaline "salts" having been boiled out of the potatoes and greens and poured down the sink.

Then there is another point: there should be balance. Neither of the above meals was well balanced. Take the "salts" alone: they have no balance of acidity and alkalinity. The meals have far too much fattening and heating material and bulk in proportion to their body-building or proteid material.

Yet, once more, it is not a matter of Food Tables. They are some guide, but all depends on how much is absorbed and how much is wanted by the individual. It is possible that too much may be absorbed by some individuals, but we believe that the general fault is that too little is absorbed from what is eaten, and that the rest may putrefy within us, and, anyhow, will need a great deal of energy before it can be expelled.

CHAPTER XIII

Simple Meals and their Body-building (Proteid) Values

1. *A GREEN Salad* (see p. 76), with cold boiled beans (made from 4 ounces of dry haricot beans, soaked for twelve hours in just as much water as they will have absorbed when cooked, then cooked), and 3 ounces of cheddar cheese cut into small pieces, or else grated or milled.

This contains about 2 ounces of proteid, and might be a good midday meal for many.

2. *Lentil Rolls* (from "Some of My Recipes"). Ingredients:—1 pint of lentils, 2 ounces of grated Parmesan cheese, a dash of savoury sauce, beaten egg, crumbs of stale wholemeal bread or biscuit, the least sprinkling of pepper and salt (or omit these).

Soak the lentils for at least six hours, then boil them, in just enough water to be soaked up by the lentils, then mash them. Add the grated cheese and the condiment, and mix well. When it is cold, form it into small rolls, brush these with the beaten egg, cover with the crumbs, and fry in boiling oil.

This contains about $4\frac{1}{2}$ ounces of proteid, and with a green vegetable (say the outside leaves of a lettuce, put in the inside pan of a double-pan cooker with a little butter and a wineglassful of water, and served without any being poured away) should make a good light meal for three or four people.

For similar dishes, see "Some of My Recipes,"

p. 78, and following. The next is taken from this book.

3. *Wheatmeal Biscuits.* 1 pound fine wholemeal flour, ¼ pound butter, ¼ pound lard or vegetable lard, 4 to 6 ounces sugar (or some very pure honey), 1 teaspoonful best baking powder, milk.

Mix these to a stiff paste with the milk. Roll out, cut into shapes, bake, and cover with toasted almonds or walnuts.

This contains about 1¼ ounce of proteid, and should go well with an apple or other fruit. For two wholemeal breads, see the above-mentioned book, pp. 106, 107.

4. *Nuts and Dried Fruits.* Out of many combinations may be chosen filberts and raisins. (A nice light lunch can be made from Brazil nuts stuffed into dates from which the stones have been extracted. Brazil nuts contain 26 per cent. of proteid, filberts 8, dates 4·4, raisins 2·5.)

Either eat very leisurely, or else mill or pound or grate the nuts. 1 ounce of proteid is contained in 9 ounces of filberts, with 10 ounces of raisins—rather a heavy meal.

CHAPTER XIV

An A-B-C-D-E-F of Cookery

IN this chapter I do not intend to give elaborate instructions, but rather to suggest principles. Nor shall I deal with the cookery of flesh-foods beyond this short quotation from a standard work. It is not so much in the cookery of flesh-foods that we err, I think, as in the cookery of vegetables and of starchy foods :—

"To boil meat or fish, place them in boiling water for five or ten minutes to coagulate the albumen on the surface and imprison the juices ; do the remainder of the cooking in water at 180° to 199° Fahr.—just below simmering (boiling point).

"Eggs should be cooked eight or ten minutes in *hot* water, not hot enough to boil ; or else placed in boiling water that is then allowed to cool.

"In frying fish and meat, use enough fat or oil nearly to cover them, and allow it to simmer.

"Boil [or, rather, heat in a double-pan cooker] all milk before you use it.

"In grilling, better burn the chop with too brisk a fire, than dry it up with too slow a one.

"In roasting meat in an oven, use a dish with double bottom, or one dish within another, the bottom one to contain water: the evaporation of the water prevents the drying up of the roast; frequent basting accomplishes the same end.

"Water that boils violently is no hotter than water that boils very quietly.

"Three pounds of potatoes are about equal to one pound of bread in food [fuel, not body-building] value.

"Bread should be baked at from 280° to 230° Fahr.

"Beef and mutton at from 240° to 220°.

"Pork and veal, from 250° to 230°.

"Puff pastry at 300°."

One is amazed to find a high medical authority, who has made a lifelong study of diet, recommending people to boil vegetables and then serve them without their juices, which are to be thrown away. It is hard to imagine less scientific advice. Here is a similar and more definite prescription taken from some one who professes to understand the Buddhist diet:—

"Cut a cabbage in two, or, if large, in four pieces, and well wash, and boil it quickly in plenty of water, adding salt and a small piece of soda. When about half done, drain it in a colander, and put it into fresh boiling water. When soft enough, drain, and press the water away. Chop it, adding a little pepper and salt. Put it into a hot pan, and turn it out on a vegetable-dish."

This is the acme of bad advice; it shows an utter sloppiness: it violates the first principle—namely, attention to cookery as an art. For here some of the best elements are thrown away, and, in order to get taste, other elements are added which are injurious to many people.

There must be **(A) Attention to Cookery as an Art.**

Elsewhere I have tried to show how it is a training for the senses of sight, hearing, touch, taste, smell, the muscular sense, discrimination, thoroughness, and accuracy. It is an art essential to the general art of economy and to the grand art of health, unless, of course, it tempts to excess, and unless it does too much of the work which the inside should do for itself. There is a happy mean to be observed. There must be just enough taste to give appetite, but not enough to arouse a false appetite. There must be just enough difficulty for the organs and their juices to contend with. There must not be too great difficulty, to over-tax these organs and their juices. We want our muscular and nervous forces for other and higher purposes than counteracting silly mistakes, and getting rid of superfluous or harmful elements.

The second principle is **(B) Balance.** Especially, as I have shown throughout this book, must there be enough *Body-building* material; then the other elements are likely to see to themselves. There is almost sure to be plenty of starchy, sugary, oily, fibrous, and watery elements; there is likely, indeed, to be an excess of them. The other element to which we have to pay attention is the "chemical." We must get not only enough body-building proteid, but also enough of the natural (plant) "salts," which serve so many purposes in the system, and particularly the alkaline "salts," which tend to neutralise poisons, and perhaps help the excretion.

(C) Cleanness is the next principle—cleanness ot only from dirt on the foods, cleanness not only

of cooking-utensils and the kitchen, cleanness not only of the cooks themselves and every part of them, but cleanness from whatever will clog the body, including excess of food. Few realise that it is a dirty habit to eat too much, even if the foods seem harmless in themselves. Fresh cheese, for instance, may be clean and harmless to many, but it is a dirty habit to take too much cheese.

Among the things that will clog the bodies of certain people are the stimulants, irritants, and narcotics (I have given lists elsewhere). The cloggers will include, in the case of many, white, starchy foods, such as white bread and pastry; and the "purins," of which a Table appears elsewhere. Whatever spoils digestion and excretion must tend to clog the body. Therefore leisurely eating is a necessity for most, for fast eating is likely to fill the body with foul stuff, and so to violate the law of cleanness. Leisurely eating will also help the digestion; it will help us to use far more of what we eat.

(D) Digestibility is the fourth principle. We cannot repeat too often that much of it depends on the pace of eating, and on the habit of mind with which one eats. This, again, may depend on the surroundings, the air, the breathing, the position of the body, and so forth.

The individual factor is important here. Things digestible to one person may be indigestible, almost paralysing, to another person. I have cited the cases where seeds and skins disagreed; where lentils disagreed; where bananas disagreed. Each is likely to have special articles—for instance, eggs. In my

own case there would be porridge, sugar, coffee, cocoa, and a few other foods. Others would have to make quite a different list for themselves.

But there is no doubt that digestion is—in very many cases—considerably helped by the dryness of the food. Take porridge: you can almost drink it; but take precisely the same stuff, without too much water, and you are forced to masticate it. That will divide up the grains and mix them with the saliva. It is especially the starchy foods that should be taken dry, instead of in their present pappy form, which Dr. Harry Campbell so wisely condemns.

Digestion is also helped by taste, which we shall consider directly. Professor Pawlow, of St. Petersburg, has proved the importance of taste for the digestion of body-building or proteid-elements, and other elements, by dogs. Though there is the opposite danger, of too pleasant a taste leading to excess.

And, again, we must carefully distinguish—Professor Pawlow fails to do this—between the effect of something on the digestion, thanks to its pleasant taste, and the after-effects on the whole system. You feel worn out; you feel disinclined for food. If you ate the food it would lie on your stomach and not be absorbed, but would rather ferment. Then you take a glass of sherry, or a tonic. Almost at once you feel inclined for food, and probably you actually digest it. But this is not the end of the story: the after-effects of the alcohol or the tonic have to be counted. What are they? It is not everything to have digested that meal: you may have injured some other part of your system in the long run.

Remember, once more, that digestion is not entirely a matter of sensation. People will tell you that they do not suffer from indigestion. They mean that they do not feel it as discomfort or pain in a certain region. I had one case of a patient who suffered from asthma. The breathing of that patient was perfect; it was the digestion that was at fault. The habitual asthma was removed by a simple change of diet, and a change of no other condition at all. I have also had cases of excessive phlegm. You would not perhaps imagine that this was simply due to the stomach and digestion, yet evidently it was, because, when I changed the one condition of the food, without changing even the pace of eating it, the phlegm disappeared; the patients were cured in that respect. One could mention numberless other ways in which indigestion shows itself, ways which people never guess to be due to indigestion at all; their headache they put down to a trouble or a stuffy room. As a matter of fact, with good digestion, the headache might be almost impossible.

Why is digestion so important? Partly because it tends to energy and pleasure; partly also because it tends to cleanness and economy.

For food which is not digested is likely to be a heavy burden. It may even ferment and putrefy, and so be actually a living cesspool within one's own system. As a result of this fermentation there may come what you are quite sure is real hunger from emptiness. In another book I have quoted a striking case of a person who wanted a supper soon after dinner. The person was convinced that her stomach was

empty. She felt so faint that she said she would drop down if she did not get her supper directly. She was made to drink two glasses of hot water. Then the stomach-tube was inserted. She closed her mouth and breathed deeply, and then at length, when she saw the contents of her stomach, was convinced beyond doubt that her stomach had all the time been full of food, but the food had been fermenting; it was fermentation, not emptiness, that had made her feel hunger. Think of the expense which that fermentation had caused her year after year. It had meant one whole extra meal every evening, to say nothing of the expense of nervous energy to digest or get rid of that extra meal. No wonder people wake still tired and heavy after eight hours of sleep, when the little cell-lives within them have been so hard at scavenger work all the time.

(E) Economy is the fifth principle. The art is often misunderstood. People imagine that they should buy food by the pound: that is to say, that the more bulky it is, the more precious it is, even if nine-tenths of it be water. One of the best rules of economy is to buy foods not according to their cheapness by weight, but according to their cheapness (see the previous chapter) in respect of ounces of proteid which you are likely to assimilate.

And, therefore, it depends on digestibility, and, once again, on leisurely eating. It has been calculated that he who masticates thoroughly may find between a half and a third of the ordinary amount of food not only sufficient for the day, but also far more satisfactory in every way.

This being so, Tables giving exact amounts are apt to be misleading. They are of some use, but must not be obeyed too implicitly. They will tell you, for instance, that, if you need an ounce of proteid to a meal, you can get that ounce for about a halfpenny from skim milk, peas, beans, and lentils, and for slightly over a halfpenny from oatmeal. But how much of the proteid do you absorb from these different foods? Perhaps it would be better for you to pay a penny or twopence, and get your ounce of proteid from another source—let us say from cheese or milk-proteid, or from some kind of nut-food with wholemeal bread.

Much of economy depends not only on what you buy, but on what you do not waste. You must learn to use odds and ends.

In my own flat I have given a series of lunches to different people. The lunches were of the most varied kind, having, on the average, four or five courses, and about seven dishes. Now, except for decayed or dirty leaves of vegetables, there need be scarcely one atom of waste. The bread is not thrown away: its crusts, which are the most valuable part of it, are used in the soup, or they are preserved and then toasted and added to foods to make them dry and crisp. The turnip-tops, outside leaves of lettuce, and so on, are not thrown away into the dustbin; they are thought by my guests to be among the most delicious vegetable dishes they have tasted. We ought to take a lesson from the French and the Japanese and other peoples, in the art of using what now we throw away. Some day, as a nation, we

shall be driven to it of necessity. It is never too early to begin to practise in case of that emergency.

Of **F (Flavour)** I have spoken already.

It may help the busy reader if I conclude with a few hints gathered chiefly from this chapter.

Take a pride in being able to cook better and better.

It is a pleasing art that saves money, gives pleasure, educates the senses, and improves the health.

Keep everything as scrupulously *clean* as you would like your own body and mind to be.

Attend first to abundance of *proteid* and good *tastes;* both should come early in the meal.

Good cooking improves the tastes and varies them (as with potatoes), breaks up and softens some foods (as with celery), helps digestion thus, and also by warming the food pleasantly.

Do *not* send up tasteless or *mushy* foods.

Get foods (including salads, please) as fresh as you can. Soak fresh *salads* in cold water, dry them in a cloth, tear them (do not use a steel knife), and dress them. Oil and lemon are a good dressing, with grated cheese on the top. Cold boiled haricot or butter beans improve many salads. Sometimes use heads of celery, radishes, turnips, etc.

Avoid bad combinations, such as vegetables and fruits at one meal; or excessive variety at *one* meal.

Reduce the added *flavours* (sauces, etc.) to the *smallest* amounts, instead of trying how much flavour, or how many flavours, you can dump in.

Don't waste. You can use radish-tops and turnip-

tops and outside leaves of lettuces as vegetables, and many things as soup-stock. Above all, do not waste valuable "*Salts*." These are often thrown away:—(1) In skins of apples, potatoes, etc.; (2) in water which has boiled vegetables. Don't use more water (for vegetables, pulses, rice, etc.) than you cannot help.

Study Prices. Do not ask, How much per pound? but how much per pound of proteid and other elements? Do not think that a food is *good* merely because it costs a lot (as oysters do), or weighs a lot (as cabbages do).

Make Notes. Have mem.-papers or cards, or mem.-boards handy, where you are bound to see them.

Soak peas and beans and oats in cold water at least twelve hours before you cook them, lentils from three to six hours, and rice for several hours. Use as much cold water as the dry foods will soak up.

Cook leisurely. Notice how the French peasants let things simmer for hours over a low fire.

To prevent boiling over, use a double pan (see notes on useful utensils).

Once more, do not be anything but proud of your work. What work, we should like to know, is so important for the family and the nation? In more than one country, cooking is a *sacred* art.

CHAPTER XV

Useful Apparatus

(THE author will provide a list of the kinds he prefers, with prices, on application, if a stamped envelope is enclosed.)

1. Good arrangement for kitchen *ventilation* without draught.

2. *Gas-stove*, or other stove, of which you can easily regulate the heat, and so save money, and prevent the kitchen from becoming too hot.

3. *Pots-au-feu*,* or fire-proof cooking vessels of earthenware, etc., in which the food-elements may be conserved, and the food served hot and without waste.

4. *Double pans*, with water in the outside one; to prevent boiling over, loss, and burning (as useful for vegetables and some puddings as for milk and porridge). An old jam-pot in hot water gives the general idea.

5. *Frying-pans*, with wire to hold the thing that is being fried.

6. *A mill* for milling nuts, some grains, and some vegetables, etc., as well as for breaking up cheese; to help digestion, especially if people *will* eat too fast.

7. *A grater* is good for nuts and cheese.

8. *A mem.-board*, with drawing-pins and clean paper, for memoranda (not to be crossed out until worked off or learnt). On this should be made—

9. Notes on *times* taken to prepare various dishes; useful flavourings; successful recipes; foods that disagree, and other good information.

* The *Chafing-dish* might be classed here.

CHAPTER XVI

Foods that People despise and waste

I KNOW a clergyman in the country who enjoys excellent health now, while his food costs him less than three-halfpence a day. As a rule he gets for his meals skim milk, porridge, and wholemeal bread with a little butter. The country-folk around him are not nearly so healthy as he is, but they laugh at him and despise him because he *prefers* what they despise. Skim milk they give to the pigs or throw away; they will not take it even as a gift. Porridge they regard as workhouse slops. Brown bread they regard as coarse; they prefer white bread, perhaps because it is fashionable, looks white, and is expensive.

Quite apart, however, from the right choice of foods, there is terrible waste going on in England. We need a war to make us realise in how many ways we are recklessly wasting foods.

First, there are the peelings of potatoes and other roots; we may compare, similarly, the bran which is peeled away from the wheat; the germ of the wheat also is often wasted. Then there are the skins of many fruits. Skins disagree with some people, though with very few when they are eaten slowly; but it is not so much the skin *as* skin I mean, but the skin as containing valuable "salts." The nearer the bone, the sweeter the meat; but the nearer the skin, the better the "salts." Many of these peelings we ought to boil; we can throw away the relics and use the juice in soups, sauces, etc.

Then there are the outside leaves of such plants as lettuce and endive. These make an excellent vegetable dish. Most of the outside leaves of a cabbage (Fig. 1) can be used for soups.

FIG. 1A.—Cabbage.

FIG. 1B.—Outside leaves of Cabbage, usually wasted.

FIG. 2A.—Turnip.

FIG. 2B.—Turnip-top, usually wasted.

Then there are the tops and leaves of potatoes, turnips (Fig. 2), beets (Fig. 3), and carrots (Fig. 4), to say nothing of the leaves of daisies, etc. These can be used either in salads or as vegetable dishes.

Next come the savoury herbs, which few gardeners grow, and still fewer use. They are invaluable as flavourings. Among them we may mention not only

FIG. 3A.—Beet.

FIG. 3B.—Leaves of Beet, usually wasted.

FIG. 4A.—Carrot.

FIG. 4B.—Leaves of Carrot, usually wasted.

parsley, which apparently has a cleansing effect as well, but also savory, thyme, mint, marjoram, etc.

Some plants, to be found in many gardens, may be used in salads or as vegetable dishes, or as simple remedies for constipation, etc.; thus we have the

dandelion and nasturtium plants. And probably within half a century we shall learn that the great majority of our green food can be eaten with good effect if only we know how to choose it and how to prepare it.

There are the seeds, too. Sunflower-seeds are a good example. All seeds are nourishing, though not all are safely edible—at least in the present state of our knowledge.

Many other instances could be cited. There are the hedge-growths, the field- and grass-growths; there are many kinds of mushrooms which now we consider poisonous; we are on the safe side, but I believe that the majority of fungoid growths are capable of use as food.

Peanuts are little known in this country, except as monkey-food, yet in theory they are among the most sustaining of all foods, having—so far as chemical analysis goes—more proteid-value than beef.

The beans also are valuable and easily grown.

If once we get to the question of growing foods in a garden, there is no end to the amount of suggestions. It is necessary in the first place to know what kind of fruit, or vegetable, or salad, or herb, etc., a given soil will encourage, as it is; what it will encourage with certain simple additions—for instance, from the household refuse, old vegetables, and the excreta of the household. Here, however, I am only treating of that which is grown already, and is either thrown away or despised.

The illustrations will enforce my point. They

are drawn from photographs taken by my friend Mr. T. F. H. Thomasset, at his little sanatorium in the Isle of Wight. The parts of the vegetables, etc., which are usually discarded, he keeps and turns into delicious vegetable dishes, soups, salads, and sauces. He manages to get good salads all the year round at very little cost.

CHAPTER XVII

The Cost of Clogging

THE verdict of Science, until quite recent years, has taken little or no account of clogging. Scientist investigators have fed thousands of people on a grossly excessive and badly prepared *régime*. On this *régime* the victims have done a certain amount of work. Their weight has been registered. When their weight remained constant, and when they were able to do their work, then the Scientist concluded that they were getting the right amount of food for a normal human being.

Cornaro, however, whose health was already despaired of when he should have been in his prime, reduced his daily diet far below the supposed minimum, and became healthier and healthier, living beyond his hundredth year. His case alone is sufficient to disestablish the law of the Scientists as a law. That law, for instance, stated that a human being needs daily, let us say, 4 ounces of body-building material or proteid. Well, he may need that if he is making all kinds of mistakes—not troubling about the preparation or choice of his foods, eating fast, worrying, and overtaxing his system in other ways; but, with the right state of mind and as little excess as possible, and as little clogging material as possible, with leisurely eating, and so forth, it is quite probable that half that amount of proteid would be the right amount for him.

Mr. Horace Fletcher, the American experimenter,

made only one change in his way of living; he masticated every mouthful of solid and liquid food as long as it had taste. He also started as an invalid and wreck, when he should have been in his prime. After five years he had found and kept the splendid energy which he possesses to-day, energy physical as well as mental. He is fitted now for a large amount of exercise; he needs less sleep; he submits to almost every test of health which can be applied; and he lives on far less than half the "scientific" and orthodox amount of food.

Every one who has examined into the quantities of food taken by poor people, tramps, factory-girls, and others, must have been struck by the small amount of proteid and the small amount of bulk also. Yet hosts of these people thrive in spite of many unfavourable conditions. Why?

The explanation seems to be that what these people lack in respect of the right quantity of proteid they make up for by a certain cleanness within.* Perhaps they do not nourish the body sufficiently, but, on the other hand, they do not clog it, in some ways, so much as the well-to-do classes.

I have cited elsewhere the case of the clogged flues. It bears repetition. One morning, after the kitchen fire had been burning for more than two hours, I found the bath-water tepid. I gave orders that the flues should be cleaned. The next morning I got up in a hurry, when a far smaller fire had been lighted for less than an hour. The water was beautifully

* Perhaps, on the other hand, their constipation keeps within them the food till it has been almost completely absorbed.

hot. It was not merely a matter of how much fuel; it was also a matter of how clean the passages were.

So with the metals. Machinery which is rusty, sandy, or gritty will require far more fuel and power than machinery which is clean and well oiled.

In the human system there are many obstacles which clogging sets in the way of our energies. *Clogging may compel us to put forth two or three times the amount of energy for a given piece of work. Therefore we actually need for that piece of work more food to supply that extra energy.* Here are some of the ways in which clogging is expensive: that is to say, in which it demands extra energy and so makes us crave extra food.

In the first place, it thickens the blood and makes the blood over-acid. Such blood—as we should guess from the analogy of a filthy canal or river—will move slowly and will not carry away the waste-products easily, and will not bring sufficient good stuff in their place.

Then, such over-acidity, etc., will tend to harden the blood-channels. Our blood-channels are not like ordinary pipes, nor even like mere elastic tubes. Apparently they are not passive tubes; they have, at intervals, movements and heart-beats of their own, rhythmic movements which hasten the blood-stream along. Owing to over-acidity and other causes they may become nearer to dead than to living material, and will not now relieve the heart as they should; most of the work is thrown upon the heart; the myriads of tiny subsidiary heartlets all over the body may have become atrophied.

So the overtaxed heart has to work excessively; it has to do work of which it should be relieved by the smaller vessels; it has to force the thick and over-acid blood through hard channels which give it little or no assistance. Through sheer fatigue it becomes weakened. A piece of work which would be a mere nothing to a strong heart pumping pure blood through lithe and active channels will become a terrible strain, a sort of heavy drudgery of weight-lifting, for the heart under the above conditions.

Besides this, the heart will have its rhythm upset. Rhythm is a vast saver of energy not only for the heart, but also for the lungs and the trunk-organs in general. Dr. Cannon has proved this for the digestive and excretive organs. He says that they have a certain rhythm; if you disturb this rhythm—for instance, through the emotions—you stop the work of the organs, or at least you hamper it. *The work which naturally would demand scarcely any effort, and therefore scarcely any food,* now demands a great effort of muscle and nerve-force, and perhaps will, and therefore a greater quantity of food. Every one knows how it is chiefly the rhythm of walking, cycling, and swimming that enables people to do so vast an amount of work.

Every cell in the body must be hampered by clogging, for every cell is reached by the blood- and lymph-streams, and a clogged blood-stream will hinder the activity and health of the cell. There is not a particle of us that does not suffer, there is not a particle of us that is not over-handicapped and over-taxed, through clogging.

The energy, besides, is called away from brain-work or body-work to excretive work. Instead of our glorious powers and faculties being devoted to glorious work, they are called away for scavenger-work. Nature demands that we shall get rid of the cloggings and impurities, and for that purpose she requires energy. If we insist on working, then we are working at an enormous expense; we are using up our reserves.

Our prime energy is needed for our highest work. If it goes to our organs of excretion, for instance, we are performing a good service and an indispensable office, it is true, but we are also impoverishing our supply for brain-work and muscular movement; perhaps we resort to some stimulant in order to continue this latter work. If, on the other hand, the prime energy does not go to the organs of excretion, then those organs of excretion suffer, and the whole system suffers by poison.

Think of the work of the system. Its work is exercise of the ordinary kind, with perhaps some extra exercise besides. The ordinary kind will include dressing, walking, moving; the extra kind will include drill, games, etc. It actually is work to maintain the positions of the body. Then there is the gigantic work of the heart, of the lungs, of the digestive and assimilative organs, of the excretive organs, including the skin. There is the work of sensation and the sending of messages from the extremities to the brain, from the brain to the extremities. All this work is to be done by the system. Most of it is done easily, provided that the

blood is pure and the rhythm undisturbed. But, once clog the blood and disturb the rhythm, and you have to work at high pressure, at a huge disadvantage.

And all these departments of work are indispensable: they have to be done somehow.

Now, suppose that x represents the amount of food which would be just enough for these functions, if the body were clear and clean, the rhythm were undisturbed, and stimulants, etc., were avoided.

Suppose, on the other hand, that a person has a clogged body, an upset rhythm; suppose that he also uses stimulants; then what will happen?

Naturally he will have a desire for more food. Perhaps there would be less harm done if he could get just the element that he needs, all by itself; but, instead of that, he takes a mass, which may or may not contain the needed element, but certainly will contain numbers of needless if not harmful elements. What is the result?

Obviously, the system becomes still more clogged, its rhythm still more upset; more stimulant is craved; more food is actually required. The person may need $2x$ of food.

So we have a vicious circle.

What are the remedies? And how can we be sure that we shall not be taking too little? We want some criterion. We do not wish to starve ourselves, and then suddenly, as it were, go off pop!

The remedies are, first, to study food-values

sensibly, and to observe at any rate the individual line of avoidance; then to masticate leisurely and thoroughly, especially when the foods are starchy and wet. With these two rules observed, we should soon get the instinct which will tell us when to eat, what to eat, and how much to eat. Just at present it would not be safe to obey our upset instincts implicitly.

CHAPTER XVIII

Values of Leisurely Eating

To select good foods is to go a long way towards health and economy. Of course the selection must not be merely according to cheapness; it must take into account the quantity of proteid, etc. To eat these foods leisurely is yet another step towards greater fitness and more economy. A few of the advantages must be mentioned in more detail here.

Obviously the thorough mastication, not with a mere up-and-down movement, but with a grinding movement as well, exercises and tends to preserve the teeth. It also has effects on the nasal passages and the breathing, helping to clear them, partly because it improves the circulation there, and partly because it keeps the mouth closed.

It breaks up the food and prepares it better for the stomach and other organs; it mixes the food with saliva, and that begins the digestion of the starchy elements.

Few people know, however, that the saliva does something else as well: it neutralises acids, and, generally, the over-acidity of the blood; it makes harmful things far less harmful. For instance, if you take alcohol leisurely, not only must you take less of it, but you must also do less harm to your inside.

Then, again, the saliva which you swallow tends to give you a feeling of satisfaction and repletion.

For these and other reasons you will need less

Mr. Horace Fletcher now lives on about a third of what "Science" supposes to be minimum amount for him. You will use more of what you do put within you. It is just the same if you read leisurely—read, mark, learn, and inwardly digest; you get more value from what you do read, and you need to read less.

There is also less waste-matter to be excreted. To keep waste-matter and excess in the system is more laborious than to carry about a handbag of dumb-bells with you wherever you go, for the waste and excess upset the rhythm of your whole system, and poison you and clog you. Mr. Horace Fletcher finds that with his thorough mastication he is not troubled with poisons inside him, as people are when they are constipated. All his excreta, his perspiration, etc., are comparatively unobjectionable now.

Less time has to be spent over digestion after a meal. There is not the sleepy feeling from which many people suffer.

Of course there must be far more taste from any given mouthful—more taste and more tastes. Mr. Fletcher claims that he gets more pleasure for the whole of his life as well as for each meal. The social pleasure is not obvious during the meal, for you cannot talk so much.* During a solitary meal, however, you can easily understand how attention to the taste will give more pleasure. Much depends, however, upon whether you do the leisurely eating

* The Thorough Mastication plan seems one pre-eminently meant for the independent bachelor.

quietly, and perhaps humorously, or whether you do it too earnestly and grimly, as if you were going through a dull "Course" of monotonous exercises with spring-grip dumb-bells.

Another advantage, besides the pleasure, is the discrimination. You should soon get an instinct which will tell you when you ought to eat, what you ought to eat, and how much you ought to eat; so that, whatever you desire, this will be right for you. Instead of having to struggle against a temptation, you merely have to do as you feel inclined; so, at least, most people claim when they have continued the system for many weeks.

Then you will have, at any rate, one thing in the world which you do thoroughly; and this should make you tend to do other things more thoroughly, in a less sleepy and slipshod way.

What control it must inevitably bring! You cannot thoroughly masticate every mouthful, even for a single meal, without a very considerable amount of self-control.

And you will be less dependent on a narrow set of foods. There are some who cannot, or will not, refuse certain foods. These people suffer. They would suffer far less if they chewed the objectionable foods carefully.

For all these reasons, then, and for others as well, more leisurely and thorough eating is worth while for nearly, if not quite, every one. Before you decide not to do it, before you let yourself go on bolting your food and your drink as well, weigh these *pros* and *cons* carefully; give yourself a fair chance.

PRINTED BY
WILLIAM CLOWES AND SONS, LIMITED,
LONDON AND BECCLES.

Works, etc., by Eustace Miles, M.A., 10, St. Paul's Road, Cambridge.

1. "**The Individual Health Course.**" Includes definite recipes and exercises and water-treatments, and detailed advice about daily life. £2 2*s*. Booklet and question-form free on application by letter or postcard.

2. "**The Individual Diet Course.**" Includes definite recipes and advice about diet, adapted to the special needs of each individual. £1 1*s*.

3. "**Some of My Recipes.**" Post free, 1*s*. 2*d*.

4. "**Good Digestion.**" Post free, 1*s*. 2*d*.

5. **Milk-Proteid Biscuits.** (*a*) Plain; (*b*) Cheese-flavoured. Carriage free, 1*s*. 9*d*. per lb. For list of cakes, etc., write to the above address.

6. **The "Eustace Miles" Vegetable Cooker.** An indispensable adjunct to an up-to-date kitchen. Carriage free, 4*s*. 2*d*.

7. **The "Eustace Miles" Protecting Fryer.** Helpful in preparing cutlets, rissoles, etc. Carriage free, 4*s*. 2*d*.

6 and 7 are also on sale at THE LADIES' SOCIAL GUILD, 35, Hart St., London, W.C.

8. "**The Open Exerciser and Expander.**" A remedy for the tendency to excessive grip and cramp or tension. This is an Exerciser to help development, not of big, fibrous muscles, but of reasonable and lithe muscles. With Book of Exercises, 12*s*. 6*d*. Extra spring, 5*s*. Carriage, 6*d*.

9. "**A Boy's Control and Self-Expression.**" About 600 pages and 250 Figs., 6*s*.; post free, 6*s*. 4*d*. Prospectus, including preface, free on receipt of stamp and address. A useful book for teachers and parents.

For other works apply to the Author at 10, *St. Paul's Road, Cambridge.*

NEWNES' LIBRARY OF USEFUL STOR

A Series of Popular Manuals on Scientific Subjects, written Specialists, and profusely illustrated. Size, 6 in. by 4 in. cloth, 1s. each. Postage 2d. extra.

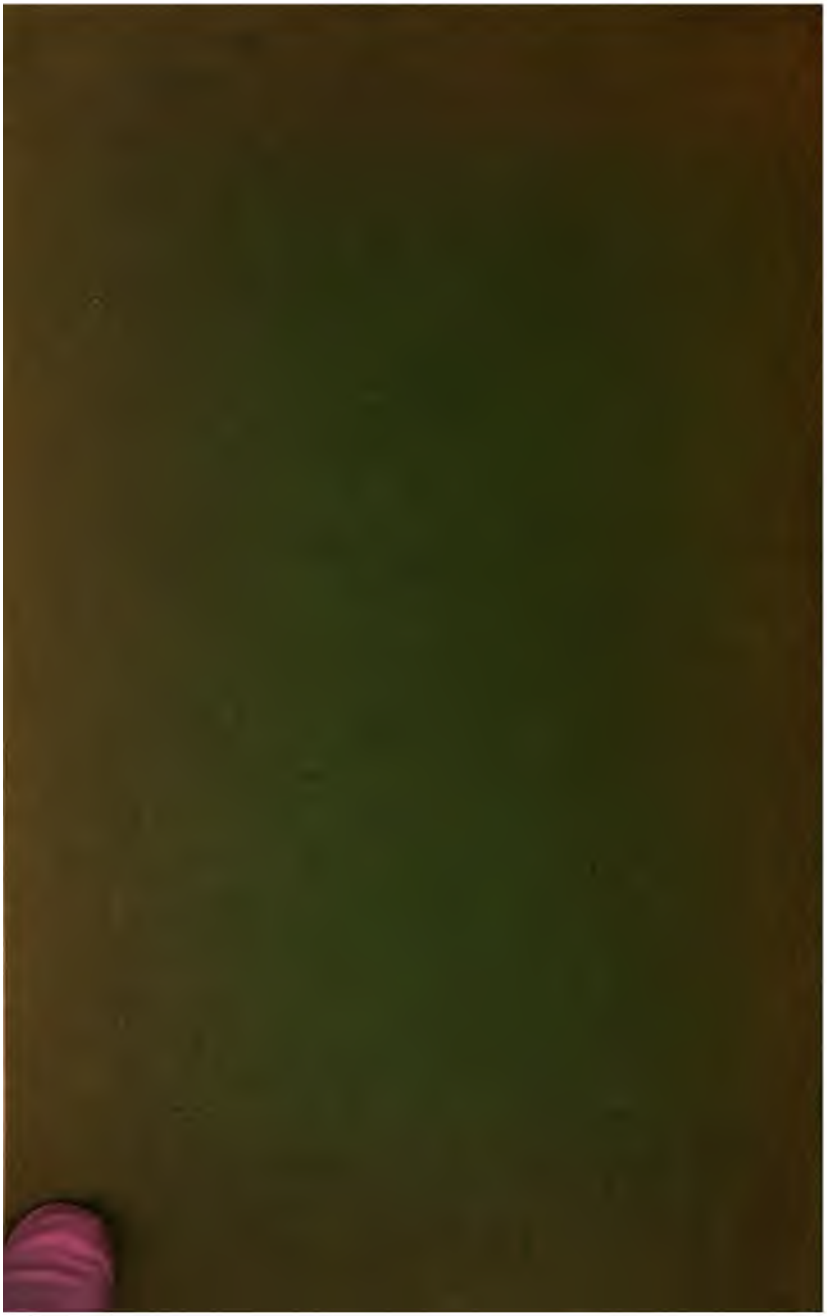
The Stars.
Primitive Man.
The Plants.
The Earth in Past Ages.
The Solar System.
A Piece of Coal.
Electricity.
Extinct Civilizations of the East.
The Chemical Elements.
Forest and Stream.
The Weather.
The Atmosphere.
Germ Life: Bacteria.
The Potter.
The British Coinage.
Life in the Seas.
Photography.
Religions.
The Cotton Plant.
Geographical Discovery.
The Mind.
The British Race.
Eclipses.
Ice in the Present and Past.
Wanderings of Atoms.
Life's Mechanism.
The Alphabet.
Bird Life.
Thought and Feeling.
Art in the British Isles.
Wild Flowers.
Books.
King Alfred.
Fish Life.
Architecture.
Euclid.
Music.
Animal Life.
Lost England.
The Empire.
Alchemy.
The Army.
Rapid Transit.
The Atlantic Ca
Extinct Civilizat of the West.
Alpine Climbing.
A Grain of Whe
Wireless Te graphy.
British Trade Industry.
Reptile Life.
The Microscope.

THE HANDY ATLAS OF THE BRITISH EMPIRE. By J. G. BARTHOLOMEW, F.R.S.E. A series of 120 Maps and Plan illustrating the Geography of the Colonies, with Statistical Notes an Tables. Cloth, 1s. net; limp lambskin, 2s. net. Postage 2d. extra.

THE HANDY TOURING ATLAS OF THE BRITISH Isles. By J. G. BARTHOLOMEW, F.R.G.S., being the Ordnance Survey of Great Britain and Ireland in miniature, contained in 120 Coloured Maps. Size, 6 in. by 4 in. Cloth, 1s. net; limp lambskin, 2s. net. Postage 2d. extra.

THE HANDY SHILLING ATLAS OF THE WORLD. Containing 120 pages of Fully Coloured Maps by J. G. BARTHOLOMEW, and a Gazetteer with 10,000 entries. Size, 6 in. by 4 in. Cloth, 1s. net. Postage 2d. extra.

GEORGE NEWNES, Ltd., 3 to 12, Southampton St., Strand, London, W.C.



This book should be returned to the Library on or before the last date stamped below.

A fine of five cents a day is incurred by retaining it beyond the specified time.

Please return promptly.

CANCELLED
APR 3 '73 H
APR 4 1973